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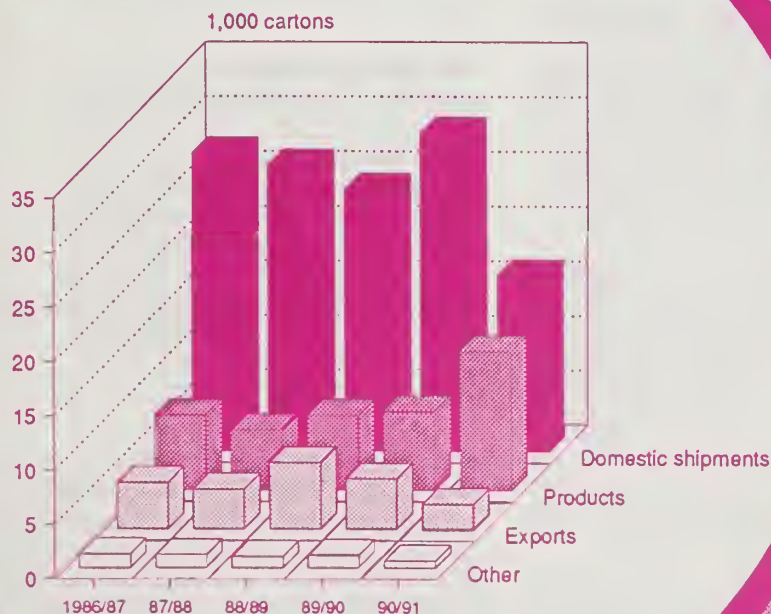
Economic  
Research  
Service

TFS-257  
March 1991

# Fruit and Tree Nuts

## Situation and Outlook Report

California Navel Orange Shipments 1/



1/ October through February.

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Katharine C. Buckley will be leaving the Economic Research Service (ERS) and making her home in Florida. Kate has been the coordinator and principal author of the *Fruit and Tree Nuts Situation and Outlook* since July 1989. In addition she has written reports on a wide range of domestic and international issues related to the fruit, vegetable, and tree nut industries. Kate has provided economic data, outlook, and analysis on the U.S. and world fruit and tree nut industries to government policy makers, researchers, industry leaders, and the general public. USDA has benefitted from Kate's professional contribution and she will be missed by her colleagues.



# Summary

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## ***Fruit Prices Record High***

Tight domestic fresh fruit supplies this winter, a result of California's late-December freeze and this season's smaller apple crop, are putting upward pressure on grower and consumer prices for fresh fruit. The index of grower prices and the Consumer Price Index for fresh fruit set new record highs in January and are expected to remain above a year earlier until harvest begins for late-spring and summer fruits. Conversely, as orange juice wholesalers continue to draw down relatively high-priced inventories, retail orange juice prices are expected to decline and place downward pressure on the Consumer Price Index for processed fruit.

Despite damages sustained in California during the late-December 1990 freeze, U.S. citrus production in 1990/91 is expected to exceed last season's. As of March, total U.S. citrus production (excluding grapefruit production in California's "other areas") was forecast at 11.4 million short tons, up 7 percent from 1989/90.

Freezing temperatures in the major California citrus growing regions between December 21 and 26, 1990, dashed prospects for a near-record navel orange harvest and significantly curtailed prospects for the State's upcoming Valencia harvest. As a result, domestic table orange supplies have tightened substantially in recent months, putting significant upward pressure on grower, wholesale, and retail prices for fresh market oranges. Encouraged by higher grower prices for fresh market oranges and relatively weak prices for process-

ing oranges, Florida growers are diverting more oranges into the fresh market. In addition, U.S. fresh orange imports are expected to increase as a result of the domestic market shortage and higher prices. On the other hand, U.S. fresh market orange exports will be significantly curtailed by the lack of high-quality fresh oranges typically demanded by major U.S. export markets.

Florida orange processors are expected to pack 65 percent more orange juice in 1990/91 than last season as a result of this season's large orange crop which followed last season's freeze-reduced supplies. However, retail orange juice sales remain sluggish despite wholesale price breaks announced in October which have yet to be fully reflected at the retail level. While additional wholesale price breaks are not expected, retail prices should decline later in the year as relatively high-priced inventories are depleted. Similarly, the demand for fresh market grapefruit is strong in 1990/91 following last season's freeze-reduced availability and high prices. However, sluggish retail demand and relatively high inventories are curbing processing demand.

Utilized production of the major non-citrus fruits in 1990 declined 6 percent from last year's record of 15.8 million short tons. Sharply smaller domestic crops of sweet and tart cherries, cranberries, and California prunes, combined with moderately smaller crops of apples, bananas, figs, grapes, kiwifruit, papayas, and peaches, more than offset larger crops of nectarines, strawberries, olives, pears, California plums, dates and avocados. However, despite

smaller total supplies, higher prices boosted the total value of utilized production of noncitrus fruit by 2 percent in 1990.

Grower prices for apples, avocados, and strawberries have improved significantly this season as a result of tight domestic supplies and strong demand. In addition, strong export demand for winter pears is supporting grower prices despite this season's record pear supplies.

U.S. tree nut production in 1990 totaled a record 964,000 short tons (in-shell equivalent), up 20 percent from 1989 and 1 percent above 1987's previous record. While prices were mixed, grower receipts are expected to be higher overall. With normal weather, production of most U.S. tree nut crops is expected to be moderately lower in 1991. Production of almonds, pistachios, and hazelnuts is expected to fall because of the alternate-year production pattern, while pecan and macadamia nut production is expected to increase. However, prospects for overall improved tree nut prices in 1991/92 will be dampened by higher carryin stocks.

Reduced water availability in California, as a result of 5 years of drought, has created some concern about fruit and tree nut production in 1991/92. However, the water shortage is not expected to significantly reduce fruit and tree nut production or raise prices. Major efforts on the part of fruit growers and public programs will be made in 1991 to facilitate shifting water to orchards and vineyards to protect high-value fruit and tree nut crops.

## Grower and Retail Prices Strengthen With Tighter Fruit Supplies

*Tighter fruit supplies this winter, a result of California's freeze, are putting upward pressure on the grower price index and the Consumer Price Index for fresh and processed fruit.*

### Strong Grower Prices for Tight Fruit Supplies

In January, the index of grower prices for fresh and processing fruit hit a record 208 (1977=100), up 7 percent from December and 22 percent above a year ago. The stronger index reflects the higher prices being paid for this season's smaller apple supplies and for fresh citrus after last December's freezing temperatures swept through California's major growing areas, significantly disrupting production. The index softened in February to 202, but remained 17 percent above a year ago as lower prices for grapefruit, oranges, tangelos, tangerines, and temples offset stronger prices for lemons, limes, apples, pears, and strawberries. The index is expected to soften seasonally this spring but remain above its year-earlier level, as relatively stronger citrus, apple, and pear prices continue to provide upward pressure until harvest begins for late-spring and summer fruits.

### Consumer Price Index for Fresh Fruit Sets New Record

Boosted by higher prices for California fresh market citrus (following last December's freeze) and bananas, and by strong demand for tighter apple supplies, the Bureau of Labor Statistics' (BLS) Consumer Price Index (CPI) for fresh fruit rose 11 percent between December 1990 and January 1991, reaching a record of 190.2 (1982-84=100). Reflecting tighter cold storage holdings throughout the country, the U.S.-average retail price for Red Delicious apples climbed to \$0.81 per pound in January, up 5 percent from December. Similarly, tighter fresh market navel orange and lemon supplies, as a result of last December's freeze, caused average retail prices to climb 46 and 16 percent above December prices to reach \$0.82 and \$1.13 per pound, respectively.

The CPI for fresh fruit is expected to remain at record levels through the spring due to reduced domestic supplies of these commodities and the prospect of a smaller California Valencia orange harvest which will begin later this month.

### Processed Fruit CPI Steady

The CPI for processed fruit in January was 134.7 (1982-84=100). Although almost 8 percent higher than January 1990, it was relatively unchanged between December 1990 and January

Figure 1

### Prices Received by Producers

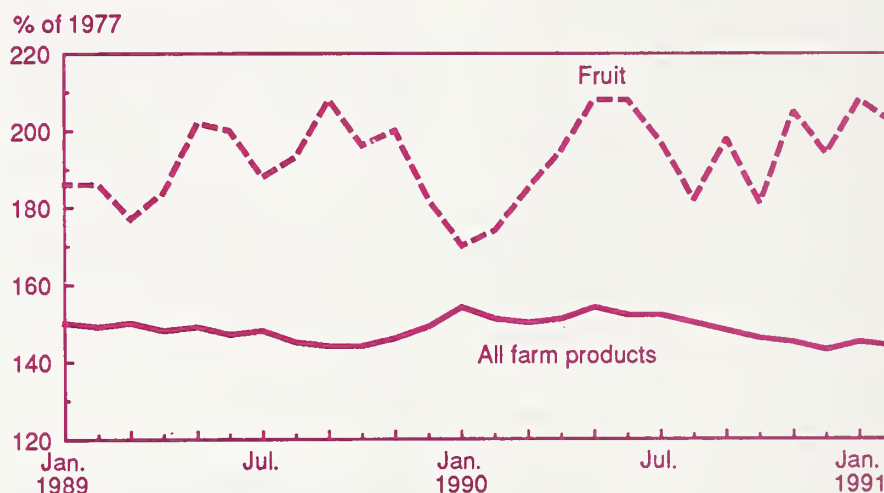
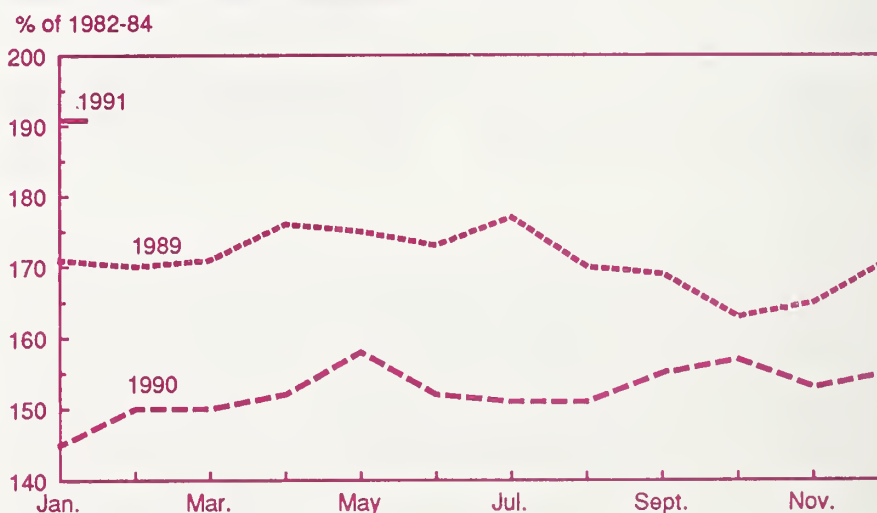


Figure 2

### Fresh Fruit: BLS Consumer Price Index



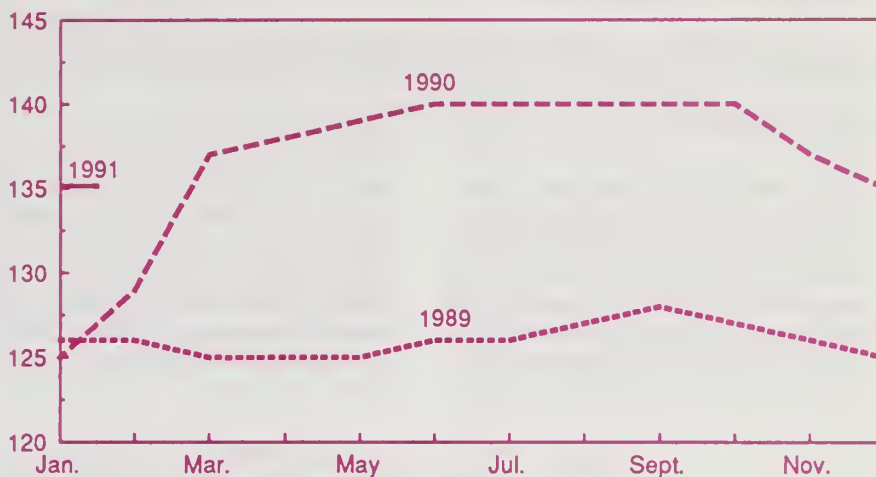
1991. Moderately higher prices for canned and dried fruits just offset weaker retail prices for frozen fruits and fruit juices. The index had been supported over the past year by record-high retail prices for frozen concentrated orange juice (FCOJ) stemming from the freeze-reduced supplies of 1989/90.

Although the tight FCOJ supply situation has been greatly alleviated by Florida's large 1990/91 orange crop and good Brazilian FCOJ supplies, wholesale price declines have yet to fully reach the retail level. However, as FCOJ wholesalers and retailers continue to draw down relatively high-priced inventories, retail orange juice prices are expected to decline and place downward pressure on the processed fruit CPI.

Figure 3

### Processed Fruit: BLS Consumer Price Index

% of 1982





# California Freeze Dampens 1990/91 U.S. Citrus Crop Prospects

*Despite damages sustained in California during the late-December 1990 freeze, U.S. citrus production is expected to exceed last season's by 7 percent.*

Severe arctic air hit California's major fruit and vegetable growing regions between December 21 and 26 causing extensive damage to the State's citrus crop. The California orange and lemon crops were hardest hit, while little damage was reported to the grapefruit crop

which generally is more resilient to cold weather and is grown in areas less affected by the freeze. Despite the loss of California citrus production, total U.S. citrus production in 1990/91 is expected to exceed last season's due to larger crop prospects in Florida and Arizona.

As of March 1991, total U.S. citrus production (excluding grapefruit production in California's "other areas") was forecast at 11.4 million short tons, up 7 percent from last season.

Table 1--Citrus fruit: Production, 1988/89, 1989/90, and indicated 1990/91 1/

Crop and State	Boxes			Ton equivalent		
	Used		Indicated	Used		Indicated
	1988/89	1989/90		1988/89	1989/90	
	--1,000 boxes-- 2/			--1,000 short tons--		
Oranges:						
Early, midseason, and						
navel varieties 3/:						
Arizona	550	380	550	21	14	21
California	34,000	44,100	16,000	1,275	1,654	600
Florida	85,300	68,100	88,000	3,839	3,064	3,960
Texas	1,200	1,050	6/	51	44	6/
Total	121,050	113,630	104,550	5,186	4,776	4,581
Valencias:						
Arizona	1,150	1,190	1,200	43	44	45
California	24,900	26,800	11,000	934	1,005	413
Florida	61,300	42,100	68,000	2,758	1,895	3,060
Texas	650	155	6/	28	7	6/
Total	88,000	70,245	80,200	3,763	2,951	3,518
All oranges:						
Arizona	1,700	1,570	1,750	64	58	66
California	58,900	70,900	27,000	2,209	2,659	1,013
Florida	146,600	110,200	156,000	6,597	4,959	7,020
Texas	1,850	1,205	6/	79	51	6/
Total	209,050	183,875	184,750	8,949	7,727	8,099
Grapefruit:						
Florida, all	54,750	35,700	46,700	2,326	1,518	1,985
Seedless	51,400	34,300	45,000	2,184	1,458	1,913
Colored	23,700	16,300	22,000	1,007	693	935
White	27,700	18,000	23,000	1,177	765	978
Other	3,350	1,400	1,700	142	60	72
Arizona	1,950	2,200	2,300	63	70	74
California	8,000	8,700	3,500	263	285	112
Desert Valleys	3,500	3,700	3,500	112	118	112
Other areas	4,500	5,000	4/	151	167	4/
Texas	4,800	2,000	6/	192	80	6/
Total	69,500	48,600	52,500	2,844	1,953	2,171
Lemons:						
Arizona	3,800	2,900	3,700	144	110	141
California	16,200	15,700	14,000	615	596	532
Total	20,000	18,600	17,700	759	706	673
Tangelos:						
Florida	3,800	2,950	2,700	171	132	122
Tangerines:						
Arizona	650	600	650	25	22	24
California	2,040	1,600	1,300	76	61	49
Florida 5/	2,900	1,700	1,900	138	81	90
Total	5,590	3,900	3,850	239	164	163
Templets:						
Florida	3,750	1,400	3,100	169	63	140
Limes:						
Florida	1,250	1,650	1,500	55	72	66
Total citrus	312,940	260,975	266,100	13,186	10,817	11,434

1/ The crop year begins with bloom of the first year shown and ends with completion of harvest the following year. 2/ Net content of box varies. Approximated averages are as follows: Oranges--California and Arizona, 75 lbs.; Florida, 90 lbs.; Texas, 85 lbs.; Grapefruit--California, Desert Valleys and Arizona, 64 lbs.; other California areas, 67 lbs.; Florida, 85 lbs.; Texas, 80 lbs.; Lemons, 76 lbs.; Tangelos, 90 lbs.; Tangerines--California and Arizona, 75 lbs.; Florida, 95 lbs.; Templets, 90 lbs.; and Limes, 80 lbs. 3/ Navel and miscellaneous varieties in California and Arizona. Early and midseason varieties in Florida and Texas, including small quantities of tangerines in Texas. 4/ The first forecast for California grapefruit "other areas" will be as of April 10, 1991. 5/ Florida "all tangerines" includes Sunburst tangerines beginning with the 1989/90 crop year. 6/ Due to the severe freeze of December 1989, the 1990/91 Texas citrus crops are virtually eliminated and forecast will not be issued this season unless sufficient commercial supplies become available.

Source: National Agricultural Statistics Service, USDA.



# California Freeze Tightens Fresh Market Orange Supplies

*A late-December freeze significantly shortened California navel orange supplies and dimmed prospects for the State's upcoming Valencia harvest. Florida and foreign shippers move to help fill the market shortfall.*

## Freeze Curtalls California Production

Freezing temperatures in the major California citrus growing regions between December 21 and 26, 1990, dashed prospects for a near-record California navel orange harvest and significantly curtailed prospects for the State's upcoming Valencia harvest. While substantial damage to 1990/91 production is apparent at this time, the extent of tree damage and wood loss as well as damage to next season's bloom have yet to be determined.

In March, total California orange production was forecast at 1.01 million short tons (27 million boxes), down 57 percent from the pre-freeze forecast and 62 percent below last season. At the time the freeze hit, only 20 percent of the State's navel crop had been harvested and Valencias were still 3 months short of maturity. The March forecast placed the navel crop at 600,000 short tons, down 60 percent from December's pre-freeze forecast and 64 percent less than last season. Similarly, the forecast for the California Valencia crop was reduced 52 percent from the pre-freeze forecast to 413,000 short tons, 59 percent smaller than last season.

## Tight Supplies Boost Prices

Although California table orange shipments before the freeze lagged a year earlier by about 12 percent, supplies tightened substantially in January and February 1991 as a result of the freeze. During the 8-week period between January 4 and February 28, 1991, California fresh orange shipments were 78 percent lighter than in the same period a year earlier. Fresh market shipments from central California, the largest navel orange growing region and the area hit hardest by the freeze, were 96 percent less than a year ago. Although some freeze-damaged navels continued to be harvested for processing, fresh market shipments were largely com-

plete in early February, leaving a gap between the completion of the navel harvest and the beginning of the Valencia harvest in early March.

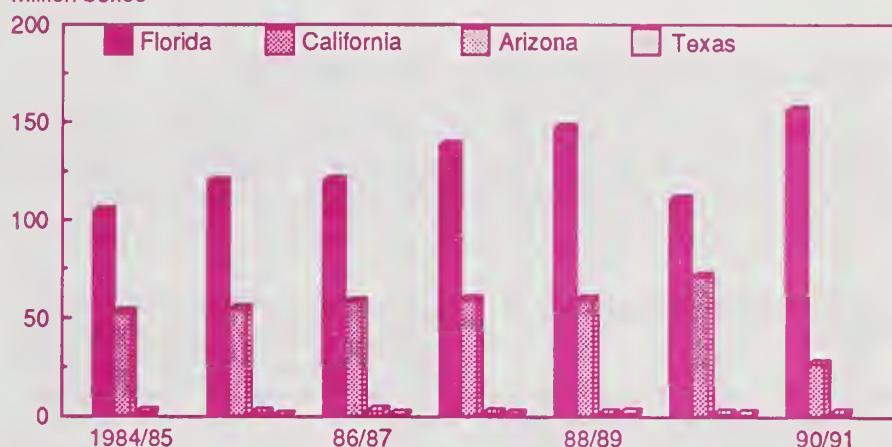
The reduction in California's orange crop has put significant upward pressure on grower, wholesale, and retail prices for fresh oranges. In January, the average grower on-tree equivalent price for

California fresh and processing navels was \$10.28 per box, double its year earlier price. The average grower price for fresh market navels alone was \$22.96, more than three times the January 1990 price. Similarly, f.o.b. prices for fresh navels in California's south and central districts ranged between \$16-\$23 per box during the month, compared with \$7.00-\$11.50 a year ear-

Figure 4

## All Oranges: Production by State

Million boxes

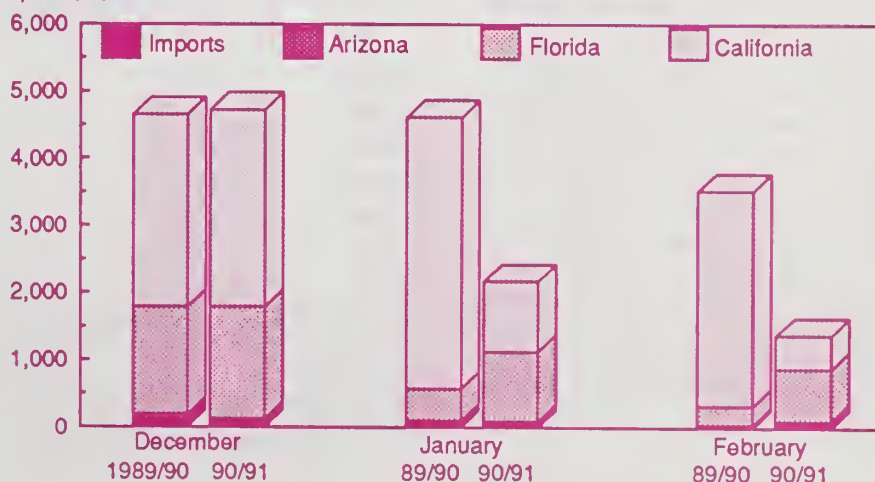


Note: No commercial supplies were harvested in Texas for 1984/85 and 1990/91 due to severe freezes.

Figure 5

## U.S. Fresh Orange Shipments

1,000 cwt



lier, while retail prices across the United States averaged 82.3 cents per pound, 32.2 cents higher than in January 1990. More oranges moving into the processing market in February put downward pressure on California grower prices for processing oranges, but grower prices for California fresh market oranges advanced with the shorter supplies.

### **Good Market Prospects for Florida and Foreign Shippers**

Encouraged by higher grower prices for fresh market oranges and relatively weak prices for processing oranges, Florida growers who have not committed fruit to processors and who can pack fresh-market-quality oranges are diverting more oranges to the fresh market. According to the Florida Department of

Citrus, about 13.5 million 90-pound boxes of round oranges and Temples, or about 8 percent of total Florida orange production, will be utilized fresh in 1990/91, up 2 million boxes from pre-freeze estimates. If the estimate is realized, this will be the largest fresh market utilization of Florida oranges in 24 years. Florida's Citrus Administrative Committee reported that 6.5 million 90-pound boxes of Florida round oranges were utilized fresh between November 1990 and the last week of February, 44 percent more than a year ago and 25 percent more than the same period in 1988/89.

While U.S. fresh orange imports, particularly from Spain and Mexico, are expected to increase as a result of the domestic market shortage and higher

prices, U.S. exports, particularly to Japan and Hong Kong, will be significantly curtailed by the lack of high-quality fresh oranges typically demanded in the major U.S. export markets. Typically, U.S. fresh orange imports account for only one percent of total U.S. fresh market supplies. On the other hand, about 20 percent of total U.S. fresh market orange production is usually exported. In February, USDA forecast total U.S. fresh orange exports for 1990/91 at 286,601 short tons, down 48 percent from last season and the smallest U.S. fresh orange export volume since 1970. U.S. fresh orange imports could reach 30,000 short tons in 1990/91, up 150 percent from last season.

## **Plenty of Orange Juice in 1990/91**

*Florida processors are expected to pack 65 percent more orange juice in 1990/91 as a result of this season's large orange crop in the State. However, retail orange juice demand remains sluggish with continuing high retail prices.*

### **Largest Florida Orange Crop in 9 Years**

Smaller-than-expected fruit sizes and higher-than-expected fruit droppage have resulted in some moderate downward revisions from October's initial forecast for the 1990/91 Florida orange crop. However, even with the downward revisions, the March forecast placed total Florida round orange production at 7.02 million short tons (156 million boxes), up 42 percent from last season and the largest crop in 9 years. In January, the Florida Department of Citrus estimated that 149.4 million boxes would be processed this season, up 42 percent from 1989/90. Of the total, the Department estimated that 110.2 million boxes would be processed into frozen concentrated orange juice (FCOJ), up 55 percent from last season, while 38 million boxes will be used for chilled, and 1 million boxes for canned orange juice. These figures are up 12 and 100 percent, respectively, from a year ago.

Overall, the 1990/91 Florida orange juice pack was estimated at 896.2 million single-strength-equivalent (SSE) gallons in January 1991, up 65 percent

from last season. As of the end of the third week in February, Florida processors were reported to have packed 94.6 million gallons (42 degrees Brix) of

Table 2---Oranges used for frozen concentrate, Florida, 1984/85-1990/91

Season	Orange and Temple production	Used for frozen concentrates 1/		Yield per box
		--Million boxes--	Percent	
1984/85	107.2	86.1	80.3	1.38
1985/86	122.2	96.1	78.6	1.38
1986/87	123.1	96.2	78.1	1.51
1987/88	141.6	110.2	77.8	1.55
1988/89	150.3	113.7	75.7	1.54
1989/90	111.6	73.6	66.0	1.23
1990/91	3/ 159.1	4/ 110.2	69.3	1.48

1/ Includes tangelos, Temples, tangerines, and K-early citrus.

2/ Gallons per box at 42.0 degrees Brix equivalent.

3/ Preliminary.

4/ Florida Department of Citrus forecast as of January 1991.

Sources: National Agricultural Statistics Service, USDA; and Florida Department of Citrus.



FCOJ, 36 percent more than a year earlier. While the Florida orange juice pack, at 3.5 million gallons, was essentially unchanged from a year earlier, the Florida chilled orange juice pack, at 203.0 million gallons, lagged production a year ago by 4 percent.

### ***Smaller Brazilian FCOJ Supplies Likely***

Numerous uncertainties currently cloud the outlook for Brazil's Sao Paulo 1991 orange crop which will begin harvest in April or May. Initial expectations made at the time of the bloom placed Brazilian production between 290 and 300 million boxes, up about 20 percent from 1990. However, despite the heavy bloom, trade reports indicate that hot, dry weather in November and December subsequently caused fruit to set poorly. Although favorable weather in recent months has increased prospects for larger fruit sizes this year compared to last, industry estimates for the harvest, as of February, are for 220-235 million boxes, down 4-10 percent from 1990. USDA has not yet released a forecast for the Brazilian 1990/91 orange crop.

### ***Orange Juice Demand Continues Sluggish***

U.S. demand for orange juice has been sluggish in 1991, as wholesale price breaks announced last October have yet to fully reach the retail level and as relatively high retail prices continue to curtail consumer purchases. While additional wholesale price breaks are not expected, retail prices should decline later in the year as retailers continue to deplete their relatively high-priced inventories.

Table 3--Florida orange-juice production, 1979/80-1989/90

Season	Frozen	Canned	Chilled 2/	Total
	concentrated 1/	single-strength 2/		
--Million sse gallons 3/--				
1979/80	1,014.0	36.5	134.8	1,185.3
1980/81	732.9	28.8	95.7	857.4
1981/82	538.4	20.6	85.6	644.6
1982/83	684.9	12.3	104.3	801.5
1983/84	489.6	10.9	92.8	593.3
1984/85	478.5	6.1	82.5	567.1
1985/86	534.8	7.1	97.3	639.2
1986/87	585.9	5.3	117.2	708.4
1987/88	686.5	4.8	137.3	828.6
1988/89	705.7	6.4	176.4	888.5
1989/90	364.7	3.4	175.4	543.5

1/ Pack from fruit, Florida Citrus Processors Association.

2/ Utilization multiplied by yield, Florida Citrus Processors Association.

3/ Sse = single-strength equivalent.

Source: Florida Department of Citrus.

Table 4--Brazilian FCOJ production and utilization, 1979/80-1990/91

	Beginning		Domestic		Ending
Season	stocks	Production	consumption	Exports	stocks
--Million 42 degree Brix gallons--					
1979/80	10.3	150.0	3.8	132.1	24.5
1980/81	24.5	170.0	4.1	171.4	19.0
1981/82	19.0	207.6	4.5	204.8	17.2
1982/83	17.2	195.8	4.5	174.8	33.8
1983/84	33.8	214.1	4.5	231.4	12.1
1984/85	12.1	270.3	3.4	263.8	15.2
1985/86	15.2	301.7	5.2	242.0	69.6
1986/87	69.6	207.9	6.9	241.0	29.7
1987/88	29.7	244.8	6.9	254.5	13.1
1988/89	13.1	245.8	6.9	243.8	8.3
1989/90	8.3	344.8	6.9	330.7	15.5
1990/91 1/	15.5	284.5	6.9	284.5	8.6

1/ Forecast.

Source: Foreign Agricultural Service, USDA.



# Ample Grapefruit Supplies in 1990/91

*The demand for fresh grapefruit is strong in 1990/91 following last season's freeze-reduced availability and high prices, but sluggish retail demand and relatively high inventories are curbing processing demand.*

## Good Grapefruit Supplies in 1990/91

Smaller-than-expected fruit sizes and heavier-than-expected fruit droppage have moderately reduced prospects for Florida's 1990/91 grapefruit harvest from October's initial forecast. The March forecast for the total U.S. grapefruit crop (excluding production in California's "other areas") placed production at 2.17 million short tons (52.5 million boxes), up 22 percent from last season's freeze-reduced production. The March forecast placed total Florida grapefruit production at 1.99 million short tons (46.7 million boxes), up 31 percent from last season, but 8 percent less than October's initial forecast. Production prospects in the California desert region and in Arizona, as of March 1991, indicate a combined crop that is about 1 percent smaller than last season's 188,000 short tons. Because of damage to Texas grapefruit trees inflicted by the December 1989 freeze, forecasts for Texas production will not be made this season unless significant commercial volumes become available.

## Strong Fresh Market Demand Offsets Weak Processing Demand

The demand for fresh grapefruit is strong in 1990/91 following last season's freeze-reduced availability and high prices. In January, the Florida Department of Citrus forecast 1990/91 fresh grapefruit utilization at a record 977,500 short tons, 49 percent of the State's total crop. Florida's Citrus Administrative Committee reported that almost 53 percent of Florida's grapefruit harvest through February had been shipped to the fresh market, compared with only 38 percent a year earlier and 47 percent 2 years ago. Processing demand for fresh grapefruit is soft this season due to sluggish retail demand for grapefruit juice and relatively high inventories.

Increased availability of fresh-market-quality Florida grapefruit and lower prices portend a good season for U.S. grapefruit exports. In February, the USDA forecast U.S. fresh grapefruit exports for 1990/91 at 523,598 short tons, up 66 percent from last season and near 1988/89's record volume. U.S. fresh grapefruit exports between September

and December 1990 were 137,789 short tons, 11 percent above a year earlier. U.S. export volume to most major foreign markets (Canada, France, and Netherlands) was significantly improved; however, shipments to Japan lagged year-ago levels, possibly because of this season's smaller grapefruit sizes.

Table 5--Fresh grapefruit shipments, Florida, 1985/86 through 1989/90 and estimates for 1990/91

Item	Season 1/ --1,000 4/5 bushel cartons--					1990/91 2/
	1985/86	1986/87	1987/88	1988/89	1989/90	
Domestic	24,469	22,764	21,337	19,482	14,276	22,500
Export	14,223	18,412	23,861	26,881	11,434	23,500
Canada	3,144	2,940	3,191	3,313	2,106	3,400
Europe 3/	4,865	6,231	8,447	8,840	3,904	8,000
Far East	6,214	9,241	12,223	14,728	5,424	12,100
Total 4/	38,692	41,176	45,198	46,363	25,710	46,000

1/ Seasons are August 1 through July 31.

2/ Florida Department of Citrus forecast as of February 1991.

3/ Includes some offshore exports not destined for Europe.

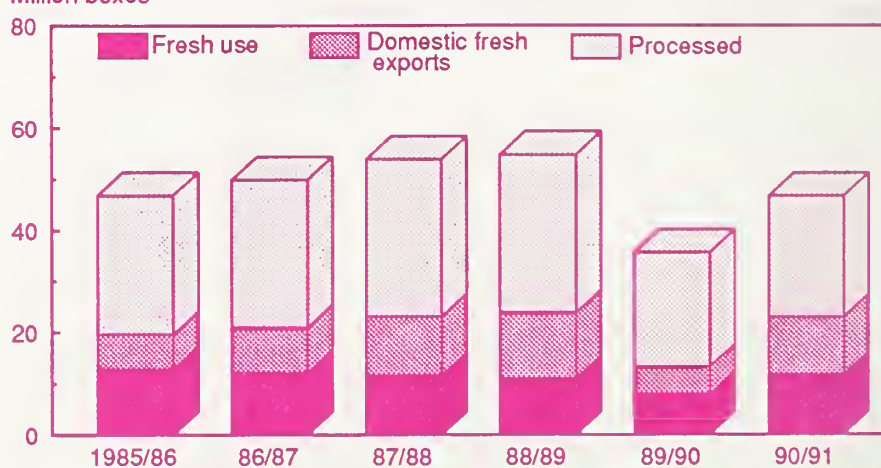
4/ Some figures may not add to total due to rounding.

Source: Florida Department of Citrus.

Figure 6

## Florida Grapefruit Production and Use

Million boxes



### **Smaller Grapefruit Juice Pack Expected**

Florida processors are expected to pack slightly more frozen concentrated grapefruit juice (FCGJ) from this season's larger crop. In January, the Florida Department of Citrus estimated that the 1990/91 pack of Florida FCGJ would total 24.9 million gallons (40 degrees Brix), 14 percent more than last season. The pack, combined with carryin stocks of 12.5 million gallons, should result in total availability of about 37.4 million gallons of Florida FCGJ. During the first 12 weeks of the FCGJ processing season which began December 1, Florida processors packed 13.2 million gallons of FCGJ, compared with 16.5 million the previous year. The smaller pack has offset sluggish movement and allowed Florida processors to draw down heavy inventories. At the end of the third week in February, Florida processors were reported holding 20.9 million gallons of FCGJ, 19 percent less than a year earlier.

Florida processors are also expected to pack more chilled grapefruit juice (CGJ) in 1990/91 as a result of the larger Florida grapefruit crop. The Florida pack of canned grapefruit juice (CSSG) is expected to barely exceed last season's 6.0 million gallons as canners

Table 6--Grapefruit used for frozen concentrate, Florida, 1984/85-1990/91

Season	1984/85 1989/91		Used for	Yield
	Production	frozen concentrates		per box
	--Million boxes--		Percent	Gallons 1/
1984/85	44.0	23.0	52.3	1.08
1985/86	46.8	21.6	46.2	1.20
1986/87	49.8	24.1	48.4	1.20
1987/88	53.8	26.7	49.6	1.20
1988/89	54.8	26.6	48.5	1.18
1989/90	35.7	19.4	54.3	1.12
1990/91 2/	46.7	--	--	1.23

-- = Not available.

1/ Gallons per box at 40.0 degrees Brix equivalent.

2/ Preliminary.

Sources: National Agricultural Statistics Service, USDA, and Florida Citrus Processors Association.

continue to draw down relatively heavy CSSG inventories built over the past 3 seasons. Florida processors were reported to have packed 16.2 million gallons of CGJ through the third week of February, 11 percent more than a year ago, with 43 percent of the total processed from fresh fruit, compared with 21 percent last year. Conversely, the Florida CSSG pack was 2.7 million gallons, lagging a year earlier by 13 percent.

Sluggish 1991 movement for CGJ as a result of continuing high retail prices has yet to offset the larger pack, leaving Florida processors holding 52 percent more CGJ inventory at the end of the third week in February than a year earlier. CSSG inventories were down 29 percent from a year ago as the smaller pack has more than offset slower movement to date. Demand is expected to continue sluggish unless retail price declines are forthcoming.



# U.S. Lemon Supplies Tighten With California Freeze

*As California's late-December freeze reduced prospects of the largest California lemon crop in over 3 years, strong demand for fresh and processing lemons continues to strengthen grower prices.*

## Freeze Reduced Crop Prospects

Following three consecutive seasons of production shortfalls, prospects for a larger 1990/91 lemon crop in California were dashed by last December's freezing temperatures. At the time of the freeze, only 25 percent of the State's lemon crop had been harvested. While temperatures in California's major lemon-growing region located in the southern part of the State were less extreme than in its primary orange production areas, losses were reported. In January and February, the post-freeze forecast placed the California lemon crop at 532,000 short tons, 18 percent less than December's pre-freeze forecast and down 11 percent from the previous season. While a 28 percent larger Arizona lemon crop will partially offset the loss, U.S. lemon production for the season is expected to total only 673,000 short tons, the smallest crop in 19 years.

## Strong Prices for Fresh and Processing Lemons

Shorter supplies of fresh market quality lemons have boosted grower prices for fresh market lemons well above last season. In February, grower on-tree prices for California fresh market lemons averaged \$20.55 per box, compared with \$14.98 a year earlier. In Arizona, where the lemon crop escaped damage from cold weather, growers have also benefitted from the short fresh market situation and high prices. Grower on-tree prices for Arizona fresh market lemons averaged \$17.55 per box in February, 22 percent above a year ago.

## Exports Curtailed in 1990/91

Because of the freeze and shortage of fresh-market-quality lemons, a larger portion of the California lemon crop is expected to be processed this season. Although movement from the California/Arizona region was running 8 percent ahead of last season through late-February, 47 percent of the harvest to date had been channeled into the processing

market, compared with 33 percent a year earlier. Grower prices for processing lemons remain relatively high—despite the increase in processing supplies—because of the strong processing demand for lemons that developed over the past four seasons of small crops. High fresh market prices in recent years have encouraged fresh market sales.

The reduction in availability of fresh market quality lemons will curtail the volume of U.S. fresh lemon exports in

1990/91. Through late February, California/Arizona fresh lemon exports lagged year-earlier levels by 9 percent and accounted for only 16 percent of the total California/Arizona lemon harvest to date, compared with 22 percent a year earlier. Also in February, USDA estimated that U.S. lemon exports would total only 137,789 short tons in 1990/91, down 7 percent from last season. Other major Northern Hemisphere lemon exporters, such as Spain and Italy, also have shorter supplies this season.

Figure 7

## U.S. Lemons: Production and Season-Average Grower Price

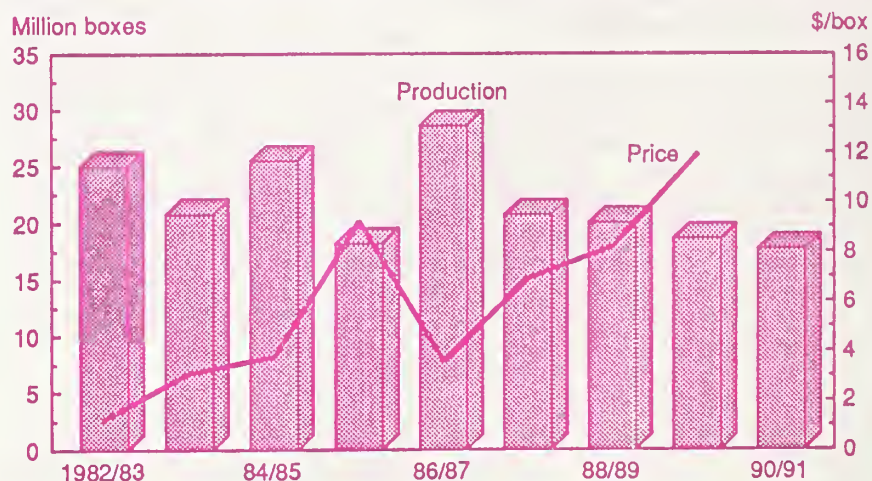
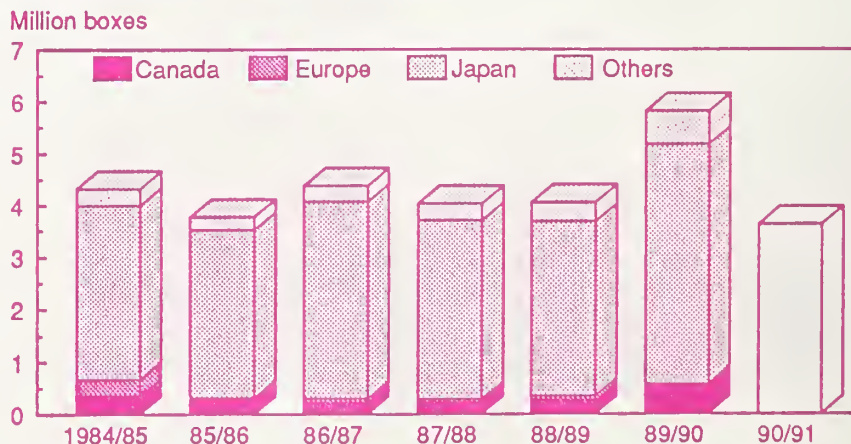


Figure 8

## U.S. Exports of Fresh Lemons



Total exports for 1990/91 estimate.



# Total Noncitrus Fruit Production Down 6 Percent in 1990

*Despite smaller total supplies, higher prices boosted the total value of utilized production of noncitrus fruit in 1990 by 2 percent.*

## Utilized Production Declines from 1989/90's Record

Utilized production of the major noncitrus fruits in 1990 declined 6 percent from 1989's record of 15.8 million short tons. Sharply smaller domestic crops of sweet and tart cherries, cranberries, and California prunes, combined with moderately smaller crops of apples, bananas, figs, grapes, kiwifruit, papayas, and peaches more than offset larger crops of nectarines, strawberries, olives, pears, California plums, dates, and avocados. The 1990 value of utilized production (excluding avocados, figs, guavas, California prunes, and pomegranates for which data are not yet available) stands at \$4.93 billion compared with 1989's \$4.84 billion (excluding the same commodities).

## California Drought Creates Production Uncertainty

The California drought, now in its fifth year, has created some concern about the 1991 fruit crop. From October 1, 1990 to March 9, 1991, precipitation in California has been about 45-50 percent of normal and runoff from major watersheds has been much below 15 percent of normal.

The drought is not expected to significantly reduce fruit production or raise prices despite the serious decline in water available for irrigation. Major efforts on the part of fruit growers and public programs will be made to facilitate shifting water to fruit trees and vineyards as the cost of losing them repre-

sents substantial investment and foregone income from future harvests.

The cold weather that gripped the Western United States in late December 1990 reportedly has had an adverse impact on the Western stonefruit crops, especially in Washington and Idaho. The pear crop was also adversely affected, especially the Bartlett crop. The cold weather and resulting damage was quite general across the West, but considerable variability seems to exist between orchards. The full extent of the damage will not be known until later this spring. Apple trees apparently handled the cold without serious damage in most States. Many factors can yet impact the 1991 U.S. fruit crop as the spring advances.

Table 7--Utilized production and value of noncitrus fruit, by types, United States, 1988-90

Crop	Utilized production			Value of utilized production		
	1988	1989	1990	1988	1989	1990
	--1,000 short tons--			--1,000 dollars--		
Apples	4,539.2	4,958.7	4,742.4	1,149,723	1,034,437	1,292,107
Apricots	93.5	119.0	120.4	33,927	40,222	41,225
Avocados	192.6	138.1	3/	220,110	249,700	3/
Bananas	6.6	6.0	5.7	4,356	4,344	4,407
Cherries, sweet	184.5	190.9	132.4	145,330	136,125	118,589
Cherries, tart	116.8	121.5	101.5	43,775	35,348	29,647
Cranberries	204.0	187.4	168.5	186,340	164,720	147,176
Dates	22.0	22.0	23.0	19,712	21,780	20,079
Figs, California	55.5	48.0	46.0	19,530	18,341	3/
Grapes	6,032.1	5,930.1	5,560.1	1,607,098	1,862,848	1,595,248
Guavas	9.3	10.3	3/	2,487	3,090	3/
Kiwifruit, California	29.5	37.0	36.0	22,420	14,800	24,264
Nectarines, California	200.0	200.0	211.0	78,861	79,645	99,940
Olives, California	87.5	123.0	131.0	45,316	60,030	60,411
Papayas	34.5	37.0	34.0	12,354	14,380	14,648
Peaches	1,224.3	1,104.4	1,055.3	382,182	360,751	365,443
Pears	860.4	916.5	958.7	235,423	253,602	284,228
Pineapples	659.0	580.0	575.0	107,402	98,310	99,255
Pomegranates 1/	18.0	18.0	--	6,454	4,906	--
Plums, California	216.0	216.0	222.0	102,661	96,146	133,804
Prunes, California	469.6	754.8	463.1	118,082	176,054	3/
Plums & prunes 2/	48.1	43.9	43.2	8,805	9,079	8,516
Strawberries	589.6	571.0	628.7	544,279	537,756	593,739
Total	15,892.6	16,333.6	15,258.0	5,096,627	5,276,414	4,932,726

1/ Discontinued after the 1989 crop.

2/ Idaho, Michigan, Oregon, and Washington.

3/ Data available July 9, 1991.

Source: National Agricultural Statistics Service, USDA.

# Apple Prices and Grower Returns Improve Significantly in 1990

*Despite a smaller apple crop in 1990, higher prices lifted the value of utilized production 25 percent above the year before.*

## Smaller Supplies Boost Prices

This season's smaller apple crop and strong export demand have held fresh apple prices significantly above a year ago. In February, the grower price for fresh apples was 20.7 cents per pound, compared to 12.4 cents for the same month the year before. Despite the 4 percent smaller crop, the total value of utilized apple production in the United States is projected at \$1.29 billion, compared to \$1.03 billion the year before. This has led to a much improved season for U.S. apple growers in most States, especially Washington, the leading apple producing State, where grower returns are projected to increase 42 percent over last year. Grower returns for the 1990/91 season are projected down more than 10 percent from the year before in Kansas, Utah, Kentucky, Virginia, Colorado, Illinois and Georgia, where higher prices were more than offset with sharp production declines.

## Exports Higher

The decline in the value of the U.S. dollar against most foreign currencies has helped to increase exports sharply ahead of last year. Exports of fresh apples for the last 6 months of 1990 were 230,852 short tons, up 20 percent from the previous year. Exports increased to almost all major markets including Taiwan, Canada, Hong Kong, the United Kingdom, and the EC. Good prices in U.S. markets this year may increase U.S. imports from Southern Hemisphere countries.

## Stocks Remain Manageable

Although apple stocks as reported by USDA's monthly Cold Storage Report are at levels slightly above a year ago,

they are not likely to present a problem this year. International Apple Institute figures indicate that apple stocks on March 1, 1991, were 11 percent below a year ago. This indicates that con-

sumer demand for apples has maintained the recovery from the Alar scare two seasons ago. With stocks at current levels, prices should remain strong for the balance of the marketing season.

Figure 9

## U.S. Fresh Apple Prices

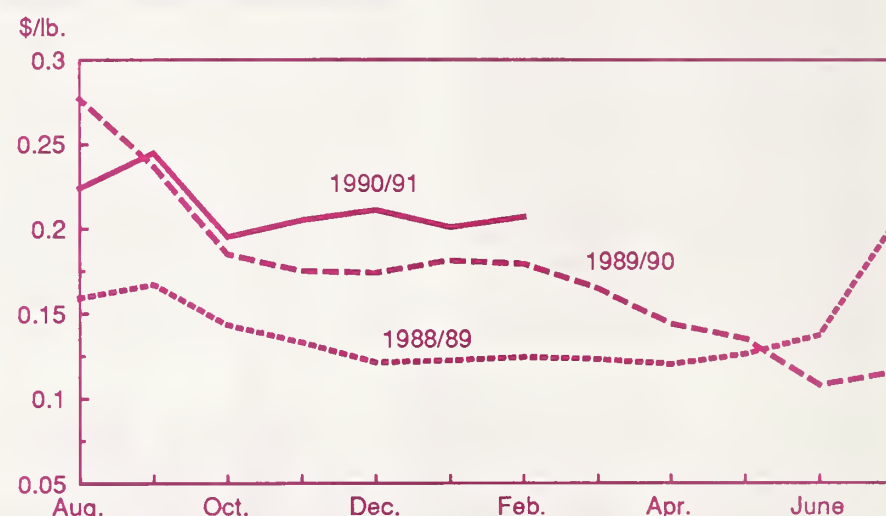


Table 8--Apples, fresh cold storage holdings  
at end of the month, 1988/89-1990/91

Months	1988/89	1989/90	1990/91
--Million pounds--			
August	5.1	8.0	8.8
September	1,857.7	2,252.0	3,005.0
October	4,601.8	4,468.1	4,589.9
November	3,904.3	3,845.8	4,003.7
December	3,265.8	3,220.8	3,378.3
January	2,659.7	2,571.7	2,694.8

Source: National Agricultural Statistics Service, USDA.



# Freezes Dampen 1990/91 Avocado Production

*U.S. avocado production in 1990/91 was tempered by Florida's December 1989 freeze and California's December 1990 freeze. U.S. exports continue to be constrained by tight supplies and high prices.*

## Smallest Florida Crop In Over 10 Years

The impact of the December 1989 freeze on Florida avocado production became apparent in 1990/91. Estimated certified shipments (includes shipments in regulated containers sold in interstate commerce) totaled only 744,500 50-pound bushels, down 42 percent from last season and the smallest crop in over 10 years. The production shortfall resulted from a light bloom and fruit set on winter-variety trees. Little damage was sustained by the summer avocado varieties, which subsequently produced a good summer crop. Harvest of the smaller 1990/91 Florida crop was essentially completed in early March.

## Freeze Reduces California Crop By 20 Percent

California avocado production was also curtailed in 1990/91 (November/December) by December 1990's freezing temperatures in the State. Although an official production forecast for the California avocado crop is not available, the California Avocado Commission estimated that approximately 20 percent of the 1990/91 California crop was lost due to freeze damage. In 1989/90, California produced 4 million 50-pound bushels of avocados, representing 75 percent of total U.S. production.

Even with the freeze damage, California avocado supplies are expected to be larger than last season's poor crop. While it is still too early to assess tree damage and loss, early indications are that trees sustained only minimal damage. However, damage to blooms could result in light fruit set and a small 1991/92 crop.

## Tight Supplies Constrain Exports

Short California avocado supplies for the third consecutive season will constrain U.S. exports again in 1990/91. U.S. avocado exports dropped from around 9,921 short tons in 1988/89 (October/September) to 6,862 short tons in 1989/90. Exports between October and

December 1990, 969 short tons, were off 60 percent from the same period last season. The short supply situation has particularly affected shipments to EC markets (France, Netherlands, and United Kingdom) and Japan. Shipments to Canada apparently were not as seriously affected.

Figure 10

## U.S. Exports of Fresh Avocados

1,000 metric tons

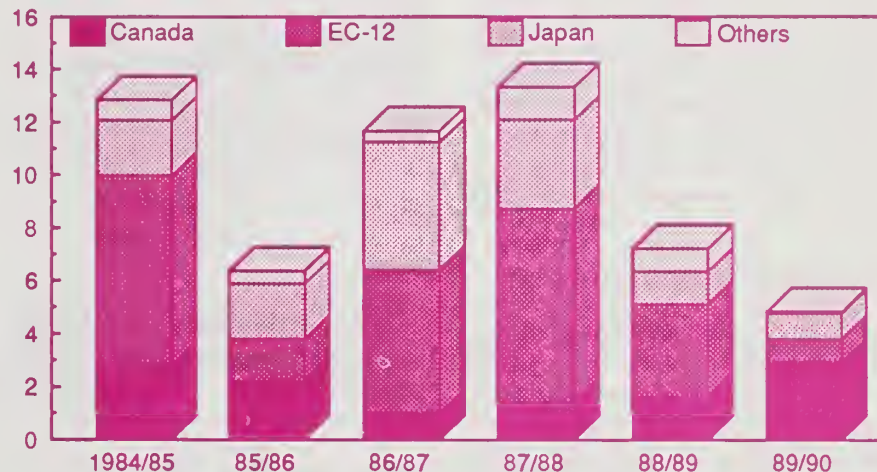


Table 9--U.S. avocado production by State, 1980/81-1989/90

Crop year	Florida	California	Hawaii	Total
--1,000 short tons--				
1980/81	30.8	238.0	0.8	269.6
1981/82	25.8	157.0	0.6	183.4
1982/83	34.7	202.0	0.8	237.5
1983/84	27.0	247.0	0.6	274.6
1984/85	29.5	200.0	0.6	230.1
1985/86	28.5	160.0	0.6	189.1
1986/87	24.7	278.0	0.7	303.4
1987/88	29.0	180.0	0.5	209.5
1988/89	27.0	165.0	0.6	192.6
1989/90	33.5	104.0	0.6	138.1

Source: National Agricultural Statistics Service, USDA.



# U.S. Pear Production Sets New Record

*Strong export demand causes prices for pears other than Bartlett to rise sharply.*

## Record High Production Again in 1990/91

U.S. pear production totaled 958,650 short tons in 1990, up over 4 percent from last season and 2 percent above the 1987 record. The increase is attributed to significant gains in Bartlett pear production in the top three producing States: California, Washington, and Oregon. For all pear production in 1990, including Bartlett, Washington was up 6.6 percent to 372,000 short tons, California was up 5.4 percent to 332,000 short tons, and Oregon was up 6 percent to 228,000 short tons. These three States accounted for over 97 percent of the total U.S. commercial pear crop in 1990. Gains in these States and Utah, were partially offset by sharp declines in all other pear producing States: New York, down 10 percent; Pennsylvania, down 41 percent; Colorado, down 38 percent; and Michigan, down 69 percent.

## Fresh Pear Exports Up Sharply

U.S. fresh pear exports so far this season (July-December) totaled 76,673 short tons, up 34 percent from last year's and equal to about 13 percent of total U.S. fresh utilization this crop year. The weaker dollar and promotion expenditures under USDA's Targeted Export Assistance program has helped boost exports. Domestic shipments have been somewhat sluggish.

## Higher Fresh Pear Prices Offset Lower Processing Prices

The proportion of the pear crop utilized as fresh dropped slightly to about 49 percent this year, compared to about 49.5 percent last year. The grower price for fresh and processed Bartlett pears declined, reflecting the much larger Bartlett crop. Prices for other pears jumped 26 percent, as total production was essentially unchanged from 1989 and exports rose. The increase in other pear prices caused the all-pear price to increase from \$277 per ton last season to \$296 this season.

## Grower Returns Increase

The total value of utilized production for the 1990 crop is estimated at \$284 million, compared to \$254 million last year. However, the value of utilized production in California declined as lower Bartlett pear prices overshadowed the increase in other pear prices. Also, sharply smaller crops in Pennsylvania, Michigan, and Colorado greatly reduced the value of production to growers in those States. Growers in Oregon and Washington had a good year, as their total value of production is

projected up 12 and 42 percent, respectively.

## January 31 Stocks Down 5 Percent

Cold storage holdings of fresh pears on January 31, 1991, totaled 191.1 million pounds, about 5 percent below the same date a year ago. This reflects a steady domestic demand but strong export demand. Because of brisk demand for fresh pears this season, prices are expected to remain strong for the balance of the season.

Figure 11

## U.S. Fresh Pear Prices

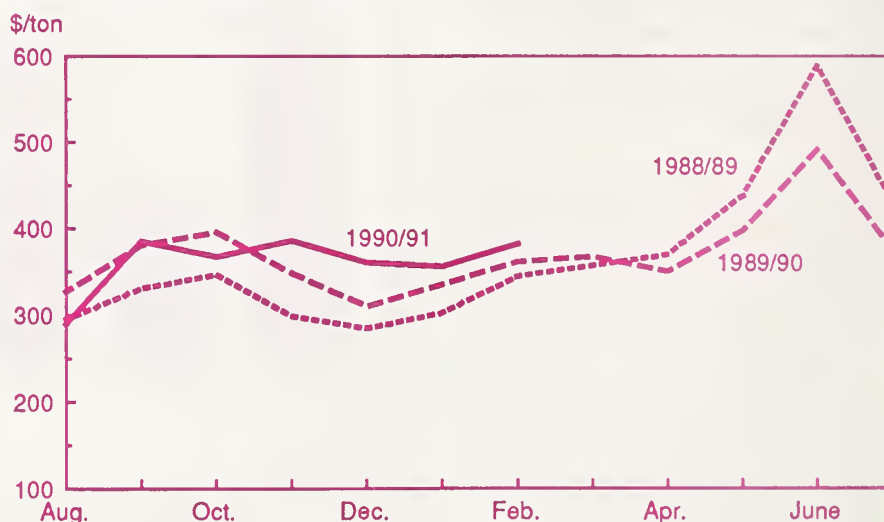


Table 10--Pears, fresh cold storage holdings at end of month, 1988/89-1990/91

Months	1988/89	1989/90	1990/91
--1,000 pounds--			
August	117,594	157,908	199,818
September	434,015	446,156	578,028
October	425,720	436,884	449,580
November	368,325	368,812	322,569
December	295,514	272,768	266,156
January	234,583	200,156	191,073

Source: National Agricultural Statistics Service, USDA.

# Market Prospects Bright for Florida and California Strawberry Growers

While Florida strawberry shipments set a new record in December 1990, California growers were moderately set back by freezing weather. With only minimal losses, California prospects appear good, with strong fresh market and processing demand.

## Record Florida Shipments in December

After suffering a setback from the December 1989 freeze, Florida strawberry production rebounded in 1990/91 with record shipments in December 1990. The industry reported that Florida shipments during the month totaled 12.9 million pounds, more than double a year earlier. Optimum weather conditions and heavier planting of early maturing varieties contributed to the larger volume of Florida strawberries shipped earlier this season.

## California Production Sustains Little Freeze Damage

California's December 21-26 freeze curbed availability of the State's fresh strawberries early in the season. Although most strawberry producing areas escaped serious damage, some replanting in freeze-damaged areas was necessary. Southern California growers began picking in late January, but volume shipments were not available until late February because of the freeze.

## Strong Demand and Firm Prices

Wholesale processing prices for strawberries firmed in late January with the anticipation that more California fruit would be moved to the fresh market this spring due to strong fresh-market demand. Although February 1 cold storage inventories of frozen strawberries were 19 percent above a year earlier, domestic and export movement has been brisk. U.S. frozen strawberry exports were 32.8 million pounds in 1990, a 67-percent gain over the same period a year ago. Most of the increase was in shipments to the Japanese market. U.S. imports of fresh and frozen strawberries are expected to decline in 1990/91 due to larger domestic supplies.

Table 11--Strawberry imports, United States, 1983-90

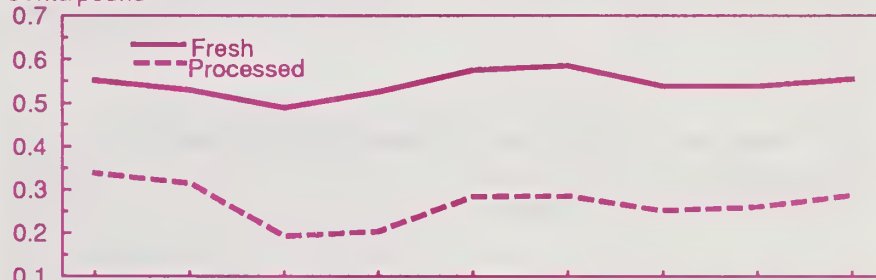
Calendar year	Fresh	Frozen
--Million pounds--		
1983	5.1	42.5
1984	8.8	50.9
1985	9.6	59.7
1986	12.9	50.7
1987	33.2	79.2
1988	30.2	64.6
1989	34.7	42.5
1990	32.2	72.0

Source: Bureau of Census, Department of Commerce.

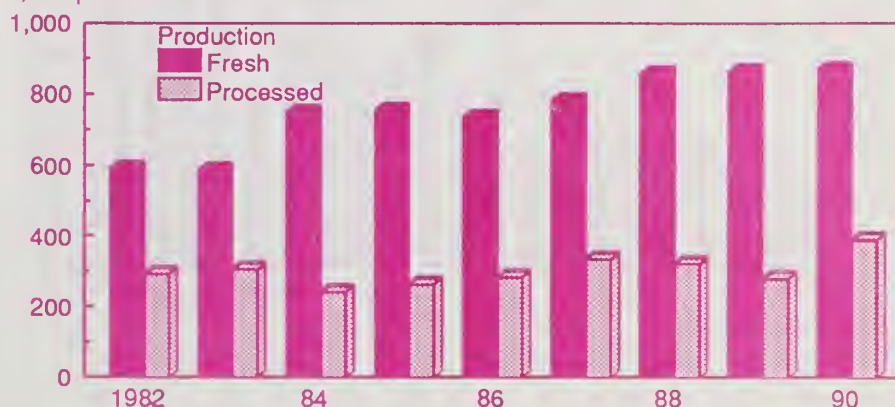
Figure 12

## U.S. Strawberries: Utilized Production and Season-Average Grower Prices

Cents/pound



1,000 pounds





# Record Tree Nut Production Pushes Supply and Receipts Higher

1990 production was higher than expected, up 20 percent from 1989. Large beginning stocks for 1990/91 caused a record supply. Prices were mixed but grower receipts will be higher overall. Prospects for improved prices in 1991/92 will be hindered by higher carryin stocks. Grower receipts could make modest gains.

U.S. tree nut production in 1990 totaled a record high 964,300 short tons (in-shell equivalent weight), up 20 percent from 1989 and 1 percent above 1987's previous record harvest of 956,900 tons. Utilized production of pecans was down substantially and walnut production was only slightly lower in 1990, but increases in almonds, hazelnuts (filberts), macadamias and pistachios more than offset these decreases. Production was higher primarily because of improved yields as overall acreage increased only slightly. Bearing acres of all tree nuts (except pecans) totaled 683,050 acres in 1990, compared with the record of 686,300 acres in 1988.

With normal weather, production of most U.S. tree nut crops is expected to be moderately lower in 1991. Production of some tree nuts (almonds, pistachios, and hazelnuts) is likely to fall because of the alternate-year production pattern. Pecan and macadamia production is likely to increase.

## Prices Mostly Lower, Grower Receipts Higher In 1990 In Spite of Record Supply

The preliminary value of production for domestic tree nuts, excluding walnuts, was \$981 million in 1990, up 26 percent from a year earlier and 5 percent above 1988. Walnut value of production will be available July 9. In aggregate, grower cash receipts for tree nuts in the 1990/91 marketing season will probably reach a new record high. In 1987/88, total grower receipts hit a record \$1.13 billion. Values of production increased for all 1990 tree nut crops.

Prices received by growers were substantially higher for pecans because of the small crop. However, growers received lower prices for other tree nuts. Prices may improve for most tree nut crops harvested in 1991 but lower expected production may cause only modest, if any, increase in grower receipts.

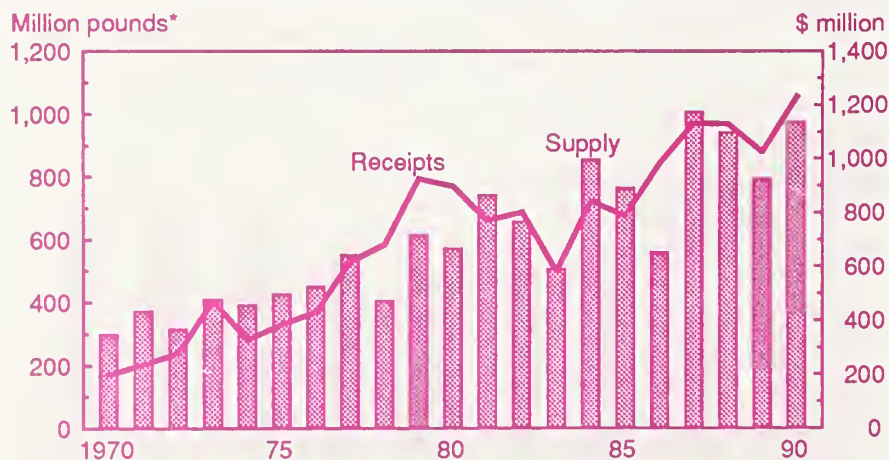
## Grower Prices and Cash Receipts for Almonds Should Improve in 1991 Crop Season

California production in 1990 was 655 million pounds, shelled basis, up 34 percent from 1989 and only 1 percent below the record high 1987 harvest. However, total supply this season, at 827 million pounds, was up about 100 million pounds or 14 percent from 1989/90. However, the marketable supply was much lower due to 214 million pounds held off the market in a reserve pool. Beginning stocks for 1990/91 were significantly lower than the previous season, but carryin to the 1991/92 marketing season could be the highest stock level yet which will hamper price recovery.

California bearing acreage of almonds fell to 407,000 acres and is expected to continue to fall as removals will more than offset small planting levels in recent years. Yield, at 1,610 shelled pounds per acre, was well above normal in 1990 but will likely be lower for 1991 due to the alternate-bearing characteristic of this crop.

Figure 13

## U.S. Tree Nut Supply vs. Grower Cash Receipts



\* Shelled basis production.

The average grower price fell to \$.85 per pound in 1990, the lowest since 1985. Prices may improve in 1991/92 if world production and supplies fall. The industry reports that almond prices are trending up and buyers are bumping up against the reserve. The Almond Board of California has announced that it will release an additional 5 percent of the reserve.

Almond supply (production plus carryin) in the major producing countries reached 647,057 short tons (shelled basis) in 1990/91, 8 percent higher than in 1989/90, due to a larger U.S. crop and large carryin stocks of Spanish almonds. U.S. and world consumption and exports are expected to be at new



record highs in 1990/91. However, ending stocks should rise from their previous high which will hinder markets in 1991/92.

### ***Record World Hazelnut Supplies Hinderling U.S. Prospects***

U.S. production in 1990, at 22,800 short tons (in-shell basis), was well-above normal. Acreage is trending up and the yield was excellent. Production and yield are likely to fall in 1991. The estimated grower price of \$781 per short ton received for the 1990 crop was lower than 1989's \$821 per ton. However, due to the large crop, total grower receipts made a significant jump over the two previous seasons. This may not be repeated in the 1991/92 season. Prices are not likely to improve much as world supplies continue well above normal. Beginning stocks and world supply of hazelnuts in 1990/91 were at record highs. Foreign production could rebound in 1991 which would increase already burdensome stocks.

### ***U.S. Pistachio Crop To Fall In 1991, but Price Will Rebound***

The California pistachio production of 118 million pounds (in-shell basis), set a new record last year. The yield of 2,290 pounds per acre was also better-than-expected for a large crop year. The U.S. crop in 1991 will likely be much smaller than in 1990.

The U.S. grower price fell sharply to \$1.09 per pound, compared with \$1.63 in 1989 and \$1.22 in 1988. The grower price is expected to rise significantly in 1991/92 but will not offset the expected smaller production. This will likely result in lower cash receipts to growers than the 1990/91 record level they received. Bearing acreage is still increasing but new plantings have slowed substantially in recent years. This portends a continued upward trend in production in future years, but at a slower pace than in recent history.

### ***Small 1990 Pecan Crop Boosts Prices Sharply***

U.S. pecan growers harvested 216 million pounds (in-shell basis) in 1990, 14 percent less than in 1989 and 30 percent below 1988. Lower supplies, even with more Mexican imports, boosted the grower price to a record \$1.14 per pound, compared with 71.5 cents per pound in 1989 and 54.1 in 1988. This has pushed 1990/91 grower receipts to a record \$246 million. Since pecans are in very short supply this year, trading has been near the \$3.70 FOB level this season for pecan pieces. Last year pecans traded at around \$2.25.

Grower cash receipts will likely decrease significantly next season, especially if 1991/92 pecan production and supplies of competing nuts increase. The trend continues upward for pecan acreage and production as the inventory of trees under 10 years of age is significant.

Beginning with the 1991/92 marketing season, the pecan industry will implement its new national research and promotion program which was recently established by the 1990 Farm Act. This program will not regulate pecan supplies but will assist the U.S. pecan industry to organize and develop better national research and promotion efforts.

### ***Smaller Walnut Crop In 1991 To Keep Prices Firm***

Last year's production of California English walnuts was larger than expected and nearly the same as in 1989 when 229,000 tons were harvested. At 220,000 tons (in-shell basis), the 1990 crop pushed supplies to a record high level. However, this is a preliminary estimate which is expected to be even higher by the end of this season. The 1990 preliminary yield was only slightly lower than the 1987 and 1989 records. Production and yield will likely be moderately lower in 1991. Bearing area has stabilized at about 178,000 acres, but new plantings in recent years are below historic levels which may cause bearing acreage to decline in the near future.

Domestic consumption and exports may hit new records, leaving ending stocks for the 1990/91 season below the two previous seasons. Since pecans are very high-priced this season, packers indicate that some customers are switching to walnuts. This news is good for walnut growers at a time when walnut supplies are plentiful and domestic demand appears to be weakening.

Although foreign walnut supplies were higher this season, U.S. exports have been good. Domestic demand has been strong for shelled walnuts partly due to reduced competition from pecan supplies. However, quality of the walnut crop this year has been reported to be low which will have a negative impact on grower prices. The demand for in-shell walnuts has softened somewhat on domestic markets, and also on markets abroad, due to large foreign supplies.

Prices will be firm in 1991 if competing supplies are not burdensome. The quality this season was more variable than in 1989/90 and a greater percentage of U.S. #2 grade was evident. Combination-grade halves and pieces have been trading at about \$1.65 per pound, while the light product has been trading in the \$1.85-\$1.95 range. For average in-shell product, growers have been receiving about 55 cents per pound or \$1100 per short ton. Better quality will add as much as 70 cents per pound, but prices for poorer quality will be much less. Grower prices for walnuts for shelling generally depend on the variety and meat yield.

### ***Macadamia Prices Steady but Production, Receipts Are Up***

Acreage, production, and value of Hawaiian macadamias continue to increase. New record highs were set in 1990 and this trend is expected to continue. Grower prices remain mostly unchanged at about 85-90 cents per pound (in-shell basis). The U.S. crop will face more competition as foreign supplies increase, but this does not appear to be a problem in the near term.

# World Nut Supply And Consumption At Record Levels

*Record world production and stocks in the tree nut complex causing downward pressure on grower prices.*

World tree nut supplies have been exceptionally large for the past two or three seasons, creating downward pressure on grower prices. World consumption continues to show strong growth, but supplies are growing at a faster pace. Areas of some tree nut crops have declined for the past several seasons but now have stabilized or shown signs of increasing again. In the United States and some Mediterranean regions, many

older and less productive orchards have been removed, leaving a smaller but stronger set of bearing trees that are more responsive to good weather conditions and improved management practices. If successful, the 10-year EC Tree Nut Program announced September 1, 1989, would assist European producers to maintain their orchards and become more competitive with U.S. tree nuts.

## ***Tree Nut Supplies Will Continue To Trend Upward***

Although beginning stocks were lower, U.S. aggregate production of tree nuts in 1990 was higher and resulted in a record supply. Similar situations existed in foreign countries where either production or stocks caused supplies to continue at very high levels. Noteworthy were near-record supplies of Spain-

Table 12--World tree nuts: Production, supply, and distribution, by country, 1988/89-1990/91 1/

Country	Marketing year 2/	Beginning stocks	Production	Imports	Total supply	Exports	Domestic consumption	Ending stocks
--Metric tons, in-shell basis--								
China (Mainland)	1988/89	0	177,100	0	177,100	54,820	122,280	0
	1989/90	0	160,050	0	160,050	51,000	109,050	0
	1990/91	0	190,000	0	190,000	63,000	127,000	0
France	1988/89	0	21,500	11,400	32,900	10,900	22,000	0
	1989/90	0	26,200	6,900	33,100	11,200	16,900	5,000
	1990/91	5,000	26,000	5,000	36,000	11,500	21,500	3,000
Greece	1988/89	8,228	66,270	5,172	79,669	19,329	50,203	10,137
	1989/90	10,137	62,083	5,338	77,558	15,485	50,786	11,287
	1990/91	11,287	49,620	9,990	70,897	9,424	51,119	10,354
India	1988/89	1,480	18,000	0	19,480	10,000	8,500	980
	1989/90	980	17,000	0	17,980	8,500	9,000	480
	1990/91	480	20,000	0	20,480	10,000	9,800	680
Italy	1988/89	44,580	197,920	67,100	309,600	105,857	150,863	52,880
	1989/90	52,880	221,240	55,538	329,658	137,352	163,726	28,580
	1990/91	28,580	191,560	70,000	290,140	84,980	171,620	33,540
Morocco	1988/89	1,998	24,642	57	26,697	3,773	20,926	1,998
	1989/90	1,998	36,963	80	39,041	3,996	32,048	2,997
	1990/91	2,997	29,970	67	33,034	3,996	26,707	2,331
Portugal	1988/89	3,313	2,997	2,298	8,608	1,389	6,660	559
	1989/90	559	11,655	633	12,847	3,663	6,827	2,358
	1990/91	2,358	9,990	616	12,964	4,163	7,160	1,642
Spain	1988/89	138,520	150,700	16,777	305,997	61,285	111,900	132,812
	1989/90	132,812	329,700	5,696	468,208	137,880	110,900	219,428
	1990/91	219,428	224,800	6,295	450,523	131,550	111,900	207,073
Syria	1988/89	260	17,900	500	18,660	200	18,000	460
	1989/90	460	18,000	300	18,760	300	18,000	460
	1990/91	460	20,000	100	20,560	500	19,000	1,060
Turkey	1988/89	68,660	535,620	0	604,280	242,330	250,290	111,660
	1989/90	111,660	656,950	0	768,610	231,330	301,290	235,990
	1990/91	235,990	491,290	0	727,280	266,330	299,290	161,660
United States 2/	1988/89	419,008	1,138,385	12,557	1,569,950	640,047	459,647	470,255
	1989/90	467,255	977,416	10,464	1,455,134	613,801	462,699	378,635
	1990/91	397,207	1,264,703	5,930	1,667,839	669,326	507,462	491,052
Totals	1988/89	686,047	2,351,034	115,860	3,152,940	1,149,929	1,221,269	781,742
	1989/90	778,742	2,517,257	84,948	3,380,947	1,214,507	1,281,225	885,215
	1990/91	903,786	2,517,933	97,997	3,519,717	1,254,768	1,352,557	912,392

1/ Includes almonds, hazelnuts, pistachios (except Iran), and walnuts.

2/ Marketing year varies by crop.

Source: Horticultural Products Review, FAS, USDA.



ish almonds, Turkish hazelnuts, and Chinese walnuts, due primarily to record stocks at the beginning of the 1990/91 season. Beginning stocks for the 1991/92 season will be only slightly lower than the previous season's record levels. If production of most foreign tree nut crops rebounds in 1991, total supplies of most tree nuts for the 1991/92 marketing season could reach new global records when combined with very large stocks.

Domestic nut industries will face stiff international competition this year and

next as global production and stocks climb higher. Increases in U.S. grower prices would be hampered under this scenario. Cash receipts for most U.S. tree nut growers could still rise in 1991 if the anticipated increases in grower prices more-than-offset expected production declines for most U.S. tree nut crops. Domestic grower prices may increase significantly for most tree nuts in the 1991/92 marketing season if domestic and export demand continues strong. The most likely scenario is that export demand will soften as foreign nut supplies increase this year, but domestic

demand for U.S. tree nuts should remain very strong.

California production of tree nuts in 1991 is not expected to suffer significantly from the continuing drought conditions as sufficient irrigation water supplies will be made available to meet perennial crop needs. More importantly, spring weather and bloom conditions followed by crop development conditions during the summer months will be the major factors determining tree nut yields.

Table 13--Tree nut supply (in-shell basis): U.S. share of world, 1989 and 1990 crop years

Crop	United States				Other countries				World			
	Quantity		Share		Quantity		Share		Quantity		Share	
	1989	1990	1989	1990	1989	1990	1989	1990	1989	1990	1989	1990
	1,000 metric tons		Percent		1,000 metric tons		Percent		1,000 metric tons		Percent	
Almonds	1,141,104	1,314,424	61.3	65.0	720,512	708,627	38.7	35.0	1,861,617	2,023,052	100.0	100.0
Hazelnuts	19,848	24,878	2.3	3.2	827,990	750,290	97.7	96.8	847,838	775,168	100.0	100.0
Pistachios 1/	35,018	63,123	33.1	54.9	70,880	51,880	66.9	45.1	105,898	115,003	100.0	100.0
Walnuts	259,164	265,414	45.8	43.8	306,430	341,080	54.2	56.2	565,594	606,494	100.0	100.0
Total	1,455,134	1,667,839	43.0	47.4	1,925,812	1,851,877	57.0	52.6	3,380,947	3,519,717	100.0	100.0

1/ Excludes Iran.

Source: Horticultural Products Review, FAS, USDA.



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Table 14--Fruits and tree nuts, bearing acreage, United States, 1980-90

Year	Citrus fruit 1/	Major deciduous fruits 2/	Minor fruits 3/	Tree nuts 4/	Total fruits and tree nuts 5/
--1,000 acres--					
1980	1,161.8	1,629.7	248.2	565.7	3,605.4
1981	1,148.0	1,612.1	255.0	561.4	3,576.5
1982	1,124.3	1,640.3	200.7	579.1	3,544.4
1983	1,091.6	1,674.4	207.0	599.0	3,572.0
1984	1,007.9	1,703.8	209.7	623.8	3,545.2
1985	899.3	1,725.0	212.3	657.1	3,493.7
1986	818.9	1,727.7	215.8	669.5	3,431.9
1987	826.2	1,739.1	217.1	675.4	3,457.8
1988	832.9	1,748.4	217.4	686.3	3,485.0
1989	847.5	1,746.7	212.0	680.0	3,486.2
1990 6/	890.4	1,747.5	120.1	683.1	3,441.1

1/ Grapefruit, lemons, limes, oranges, tangelos, tangerines (including honey tangerines), and Temples. Acreage is for the year of harvest. 2/ Commercial apples, apricots, cherries, grapes, nectarines, peaches, pears, plums, and prunes. 3/ Avocados, bananas, cranberries, dates, figs, guavas (beginning 1988), kiwifruit, olives, papayas, pineapples, and pomegranates (until 1989). 4/ Almonds, hazelnuts, macadamia nuts, pistachios, and walnuts. 5/ Some total may not add due to rounding. 6/ Preliminary.

Source: National Agricultural Statistics Service, USDA.

Table 15--Stocks of frozen fruits: End of January, 1987-91

Frozen fruit	1987	1988	1989	1990	1991 1/
--1,000 pounds--					
Apples	69,645	74,899	73,583	74,009	86,814
Apricots	3,498	6,490	5,885	7,417	6,107
Blackberries	15,655	19,649	22,114	13,495	13,464
Blueberries	43,972	44,015	61,401	64,227	64,239
Boysenberries	2,699	4,139	3,491	2,611	3,381
Cherries, tart (RSP)	127,997	134,922	112,308	114,152	59,664
Cherries, tart (juice)	2/	2/	2/	4,864	3,414
Cherries, sweet	11,158	11,722	19,920	19,231	13,115
Grapes	2,215	2,866	3,973	5,744	4,393
Peaches	32,371	72,586	89,309	78,978	92,198
Raspberries, red	23,862	33,036	34,477	33,597	31,934
Strawberries	128,042	212,150	205,421	142,684	170,069
Other	171,202	173,685	202,595	166,882	200,427
Total	632,316	790,159	834,477	727,891	749,219

1/ Preliminary.

2/ Juice cherries included in all tart cherries prior to January 1990.

Source: National Agricultural Statistics Service, USDA.

Table 16---Production and utilization of specified noncitrus fruits, United States, 1988-90

Commodity and year	Production		Utilization 1/									
	Total	Utilized 2/	Fresh	Processed (fresh equivalent)								Total 2/
				Canned	Frozen	Brined	Crushed for		Oil	Dried	Other 3/	
							Wine	Juice				
---1,000 short tons---												
Apricots:												
1988 4/	101.6	93.5	18.2	44.5	12.2	---	---	---	---	17.7	---	75.3
1989 4/	120.0	190.9	15.8	67.0	11.0	---	---	---	---	25.0	---	103.2
1990 4/	122.5	120.4	24.7	64.0	11.0	---	---	---	---	20.0	---	95.7
Bananas:												
1988	6.6	6.6	6.6	---	---	---	---	---	---	---	---	---
1989	6.0	6.0	6.0	---	---	---	---	---	---	---	---	---
1990	5.7	5.7	5.7	---	---	---	---	---	---	---	---	---
Cherries, sweet:												
1988	186.2	184.5	87.2	15.0	---	67.6	---	---	---	---	6/ 14.7	97.3
1989	193.5	191.9	103.5	15.0	---	58.0	---	---	---	---	6/ 14.5	87.4
1990	156.7	132.4	71.0	9.0	---	39.1	---	---	---	---	6/ 13.2	61.4
Cherries, tart:												
1988	118.1	116.8	2.5	27.9	80.8	---	---	---	---	---	5.6	114.3
1989	132.1	121.5	3.4	25.4	88.1	---	---	---	---	---	4.7	118.2
1990	104.4	101.5	2.5	35.6	60.0	---	---	---	---	---	3.5	99.0
Dates:												
1988	22.0	22.0	22.0	---	---	---	---	---	---	---	---	---
1989	22.0	22.0	22.0	---	---	---	---	---	---	---	---	---
1990	23.0	23.0	23.0	---	---	---	---	---	---	---	---	---
Figs:												
1988	55.5	55.5	1.5	---	---	---	---	---	---	54.0	---	54.0
1989	48.0	48.0	1.5	---	---	---	---	---	---	46.5	---	46.5
1990	46.0	46.0	1.6	---	---	---	---	---	---	44.4	---	44.4
Grapes:												
1988	6,033.7	6,032.1	831.3	40.0	---	---	2,982.1	351.7	---	1,827.0	---	5,200.8
1989	5,930.9	5,930.0	787.2	40.0	---	---	2,850.1	388.8	---	1,864.0	---	5,142.8
1990	5,560.2	5,560.1	767.0	40.0	---	---	2,660.0	326.0	---	1,767.1	---	4,793.1
Kiwifruit:												
1988	32.7	29.5	29.5	---	---	---	---	---	---	---	---	---
1989	40.0	37.0	37.0	---	---	---	---	---	---	---	---	---
1990	39.0	36.0	36.0	---	---	---	---	---	---	---	---	---
Nectarines:												
1988	200.0	200.0	199.0	---	---	---	---	---	---	---	---	1.0
1989	200.0	200.0	199.0	---	---	---	---	---	---	---	---	1.0
1990	211.0	211.0	208.5	---	---	---	---	---	---	---	---	2.5
Olives:												
1988	87.5	87.5	0.5	7/ 70.0	---	---	---	---	3.0	---	8/ 14.0	87.0
1989	123.0	123.0	0.5	7/ 94.0	---	---	---	---	5.5	---	8/ 23.0	122.5
1990	131.0	131.0	0.5	7/ 88.0	---	---	---	---	4.5	---	8/ 38.0	130.5
Papayas:												
1988	34.5	34.5	28.5	---	---	---	---	---	---	---	---	6.0
1989	37.0	37.0	32.0	---	---	---	---	---	---	---	---	5.0
1990	34.0	34.0	29.5	---	---	---	---	---	---	---	---	4.5
Peaches:												
1988	1,307.1	1,224.3	611.7	493.0	66.0	---	---	---	---	20.6	33.1	612.6
1989	1,167.4	1,104.4	519.3	459.2	72.0	---	---	---	---	14.3	39.7	585.1
1990	1,102.6	1,055.3	452.9	478.7	84.9	---	---	---	---	13.6	25.4	602.5
Pears:												
1988	860.9	860.4	427.1	9/ 425.4	---	---	---	---	---	7.9	---	433.3
1989	916.8	916.5	454.2	9/ 455.5	---	---	---	---	---	6.7	---	462.2
1990	958.8	958.7	470.3	9/ 480.8	---	---	---	---	---	7.6	---	488.4
Pineapples:												
1988	659.0	659.0	133.0	---	---	---	---	---	---	---	---	526.0
1989	580.0	580.0	145.0	---	---	---	---	---	---	---	---	435.0
1990	575.0	575.0	145.0	---	---	---	---	---	---	---	---	430.0
Plums, CA:												
1988	216.0	216.0	---	---	---	---	---	---	---	---	---	---
1989	216.0	216.0	---	---	---	---	---	---	---	---	---	---
1990	222.0	222.0	---	---	---	---	---	---	---	---	---	---
Prunes, CA:												
1988	469.6	469.6	---	---	---	---	---	---	---	469.6	---	469.6
1989	754.8	754.8	---	---	---	---	---	---	---	754.8	---	754.8
1990	463.1	463.1	---	---	---	---	---	---	---	463.1	---	463.1
Other prunes & plums 5/:												
1988	52.0	48.1	24.0	13.4	1.3	---	---	---	---	9.4	---	24.1
1989	47.0	43.9	22.8	13.0	1.2	---	---	---	---	7.0	---	21.1
1990	47.8	43.2	24.3	9.6	0.4	---	---	---	---	8.9	---	18.9
Strawberries:												
1988	589.6	589.6	427.8	---	---	---	---	---	---	---	---	161.8
1989	571.0	571.0	430.8	---	---	---	---	---	---	---	---	140.2
1990	628.7	628.7	433.6	---	---	---	---	---	---	---	---	195.1

1/ For all items except bananas and California apricots, dates, plums, and prunes, some quantities canned, frozen, or otherwise processed are included in other utilization categories to avoid disclosure of individual operations. 2/ Some totals do not add due to rounding. 3/ Tart cherries, juice, wine, and brined; sweet cherries, frozen, juice, etc.; and olives, chopped, minced, brined, and other cures. 4/ Missing data are not published to avoid disclosure of individual operations, but are included in total. 5/ Michigan, Idaho, Oregon, and Washington. 6/ Frozen juices. 7/ Canning size fruit only mostly whole and pitted but also includes some chopped and sliced. 8/ Limited (canned sliced, chopped, wedged and undersize. 9/ Mostly canned, includes small quantities dried; other, excluding California dried pears, uses not published by State to avoid disclosure of individual operations.

Source: National Agricultural Statistics Service, USDA.



Table 17--Fruit and edible tree nuts: Utilized production, 1989 and 1990

Commodity	Unit	1989			1990 1/		
		Fresh	Processed	All	Fresh	Processed	All
Noncitrus:							
Apples, commercial	Mil. lbs.	5,865	4,052	9,917	5/	5/	9,485
Apricots, 3 States	Tons	15,750	103,200	118,950	24,740	95,700	120,440
Avocados 2/	Tons	126,050	12,000	138,050	5/	8/	5/
Avocados, California 2/	Tons	92,000	12,000	104,000	5/	8/	5/
Bananas, Hawaii	1,000 lbs.	11,900	--	11,900	11,300	--	11,300
Cherries, sweet	Tons	103,510	87,420	190,930	71,000	61,350	132,350
Cherries, tart	Mil. lbs.	6	237	243	5	198	203
Cranberries	Bbls.	254,500	3,407,500	9/3,747,000	6/	6/	3,370,000
Dates, California	Tons	22,000	8/	22,000	23,000	8/	23,000
Figs, California	Tons	1,500	46,500	48,000	1,600	44,400	46,000
Grapes	Tons	787,230	5,142,820	5,930,050	766,980	4,793,100	5,560,080
Grapes, California	Tons	760,000	4,630,000	5,390,000	739,000	4,346,000	5,085,000
Guavas, Hawaii	1,000 lbs.	--	20,600	20,600	5/	8/	5/
Kiwifruit, California	Tons	37,000	8/	37,000	36,000	8/	36,000
Nectarines, California	Tons	199,000	1,000	200,000	208,500	2,500	211,000
Olives, California	Tons	500	122,500	123,000	500	130,500	131,000
Papayas, Hawaii	1,000 lbs.	64,000	10,000	74,000	59,000	9,000	68,000
Peaches	Mil. lbs.	1,039	1,170	2,209	906	1,205	2,111
Pears	Tons	454,220	7/462,230	916,450	470,260	7/488,390	958,650
Pineapples, Hawaii	Tons	145,000	435,000	580,000	145,000	430,000	575,000
Plums, California	Tons	8/	8/	216,000	8/	8/	222,000
Pomegranates, California	Tons	--	226,000	226,000	--	--	--
Prunes and plums, other States	Tons	22,750	21,100	43,850	24,300	18,900	43,200
Strawberries	1,000 lbs.	862	280	1,142	867	390	1,257
Citrus: 3/							
Oranges	1,000 boxes	51,859	157,191	209,050	57,505	128,570	186,075
Tangerines	1,000 boxes	3,634	1,956	5,590	2,787	1,113	3,900
Grapefruit	1,000 boxes	34,627	34,873	69,500	22,315	26,285	48,600
Lemons	1,000 boxes	12,280	7,720	20,000	12,227	6,373	18,600
Limes	1,000 boxes	950	300	1,250	1,010	640	1,650
Tangelos	1,000 boxes	1,348	2,452	3,800	1,118	1,832	2,950
Templets	1,000 boxes	869	2,881	3,750	145	1,255	1,400
Tree Nuts:							
Almonds, California 4/	1,000 lbs.	--	--	490,000	--	--	655,000
Hazelnuts, 2 States	Tons	--	--	13,000	--	--	22,800
Macadamia nuts, Hawaii	1,000 lbs.	--	--	50,500	--	--	53,500
Pistachios	1,000 lbs.	--	--	39,000	--	--	118,000
Pecans, all	1,000 lbs.	--	--	250,500	--	--	216,200
Improved	1,000 lbs.	--	--	161,000	--	--	157,450
Native and seedling	1,000 lbs.	--	--	73,200	--	--	38,550
Walnuts, 2 States	Tons	--	--	229,000	--	--	220,000

-- = Not available.

1/ Preliminary. 2/ 1989 indicated 1989/90. 3/ 1989 indicated 1988/89. 4/ Shelled basis. 5/ Data available July 9, 1991. 6/ Data available August 20, 1991.

7/ Processed mostly canned, but includes small quantities of dried and other uses. 8/ Missing data are not published to avoid disclosure of individual operations.

9/ Includes shrinkage.

Source: National Agricultural Statistics Service, USDA.

Table 18--Fruit and edible tree nuts: Value of utilized production, 1989 and 1990

Commodity	1989			1990 1/		
	Fresh	Processed	All	Fresh	Processed	All
--1,000 dollars--						
Noncitrus:						
Apples, commercial	817,061	217,376	1,292,107	5/	5/	1,292,107
Apricots, 3 States	10,651	29,571	40,222	14,598	26,627	41,225
Avocados 2/	222,220	27,480	249,700	5/	5/	5/
Avocados, California 2/	210,680	27,480	238,160	5/	5/	5/
Bananas, Hawaii	4,344	---	4,344	4,407	---	4,407
Cherries, sweet	96,489	39,636	136,125	92,598	25,991	118,589
Cherries, tart	2,307	33,041	29,647	5/	5/	5/
Cranberries	---	---	164,720	---	---	6/
Dates, California	21,780	---	21,780	20,079	---	20,079
Figs, California	---	---	18,341	---	---	5/
Grapes	471,222	1,391,626	1,862,848	413,722	1,181,526	1,595,248
Grapes, California	449,900	1,242,185	1,692,085	386,689	1,045,952	1,432,641
Guavas, Hawaii	---	3,090	3,090	---	5/	5/
Kiwifruit, California	14,800	---	14,800	24,264	---	24,264
Nectarines, California	---	---	79,645	---	---	99,940
Olives, California	250	59,780	60,030	250	60,161	60,411
Papayas, Hawaii	14,080	300	14,380	14,396	252	14,648
Peaches	241,229	119,522	360,751	240,795	124,648	365,443
Pears	152,606	7100,996	253,602	184,230	7/ 99,998	284,228
Pineapples, Hawaii	59,160	39,150	98,310	55,825	43,430	99,255
Plums, California	---	---	96,146	---	---	133,804
Pomegranates, California	---	---	4,906	---	---	---
Prunes, California	---	176,054	176,054	---	5/	5/
Prunes and plums, other States	6,564	2,515	9,079	6,077	2,439	8,516
Strawberries	464,499	73,257	537,756	481,638	112,101	593,739
Citrus: 3/						
Oranges	515,734	1,332,840	1,848,574	581,996	872,934	1,454,930
Tangerines	72,723	10,396	83,119	65,190	5,176	70,366
Grapefruit	265,521	152,612	418,133	268,990	113,888	383,878
Lemons	220,052	14,554	234,606	258,240	19,965	278,205
Limes	20,520	954	21,474	21,412	1,472	22,884
Tangelos	13,615	17,777	31,392	11,068	8,977	20,045
Templets	7,821	20,023	27,844	2,828	7,593	10,421
Tree Nuts:						
Almonds, California 4/	---	---	480,930	---	---	542,300
Hazelnuts, 2 States	---	---	10,664	---	---	17,799
Macadamia nuts, Hawaii	---	---	44,945	---	---	45,475
Pistachios	---	---	63,570	---	---	128,620
Pecans, all	---	---	179,040	---	---	246,461
Improved	---	---	126,491	---	---	188,788
Native and seedling	---	---	39,350	---	---	31,651
Walnuts, 2 States	---	---	245,030	---	---	5/

--- = Not available.

1/ Preliminary. 2/ 1989, indicated 1989/90. 3/ 1989, indicated 1988/89. 4/ Shelled basis. 5/ Data available July 9, 1991. 6/ Data available August 20, 1991.

7/ Processed mostly canned, but includes small quantities of dried and other uses.

Source: National Agricultural Statistics Service, USDA.

Table 19--Summary of crop values, United States, 1988, 1989, 1990, and percent change

Table 10. Summary of crop values, United States, 1988, 1989, 1990, and percent change					
Commodity	1988	1989	1990	Percent change from	
				1988	1989
	--1,000 dollars--			--Percent--	
CITRUS:					
Oranges	1,773,681	1,848,574	1,454,930	-18	-21
Grapefruit	478,588	418,133	383,878	-20	-8
Lemons	202,046	234,606	278,205	38	19
Limes, Florida	23,314	21,474	22,884	-2	7
Tangelos, Florida	32,605	31,392	20,045	-39	-36
Tangerines	80,400	83,119	70,366	-12	-15
Temples, Florida	27,940	27,844	10,421	-63	-63
NONCITRUS:					
Apples	1,149,723	1,034,437	1,292,107	12	25
Apricots	33,927	40,222	41,225	22	2
Avocados	220,110	249,700	3/	--	--
Bananas, Hawaii	4,356	4,344	4,407	1	1
Cherries, sweet	145,330	136,125	118,589	-18	-13
Cherries, tart	43,775	35,348	2/ 29,647	-32	-16
Cranberries	186,340	164,720	2/ 147,176	-21	-11
Dates, California	19,712	21,780	20,079	2	-8
Figs, California	19,530	18,341	3/	--	--
Grapes	1,607,098	1,862,848	1,595,248	-1	-14
Guavas	2,487	3,090	3/	--	--
Kiwifruit, California	22,420	14,800	24,264	8	64
Nectarines, California	78,861	79,645	99,940	27	25
Olives, California	45,316	60,030	60,411	33	1
Papayas, Hawaii	12,354	14,380	14,648	19	2
Peaches	382,182	360,751	365,443	-4	1
Pears	235,423	253,602	284,228	21	12
Pineapples, Hawaii	107,402	98,310	99,255	-8	1
Pomegranates 1/	6,454	4,906			
Plums, California	102,661	96,146	133,804	30	39
Prunes, dried, California	118,082	176,054	3/	--	--
Prunes and plums, ex. Calif.	8,805	9,079	8,516	-3	-6
Strawberries	544,279	537,756	593,739	9	10
TREE NUTS:					
Almonds, California	600,075	480,930	542,300	-10	13
Hazelnuts	14,082	10,664	17,799	26	67
Macadamia, Hawaii	40,950	44,945	45,475	11	1
Pecans	166,658	179,040	246,461	48	38
Pistachios, California	114,680	63,570	128,620	12	102
Walnuts, California	192,698	245,030	3/	--	--
Total	8,844,344	8,965,735	8,743,793	-1	-2

-- = Not available.

1/ Discontinued after the 1989 crop.

2/ Used 1989 price to compute value of production.

3/ Available July 9, 1991.

Source: National Agricultural Statistics Service, USDA.



Table 20--Summary of crop value, by State, 1989-90

State	Crop value		Proportion of U.S.	
	1989	1990	1989	1990
	Million pounds		Percent	
Alabama	13,904	8,596	0.2	0.1
Arizona	99,805	139,122	1.1	1.6
Arkansas	5,251	9,187	0.1	0.1
California	4,736,317	4,833,263	52.8	55.4
Colorado	7,946	11,702	0.1	0.1
Connecticut	8,084	9,074	0.1	0.1
Delaware	1,825	3,008	1/	1/
Florida	1,922,454	1,280,275	21.4	14.6
Georgia	84,570	120,514	0.9	1.4
Hawaii	165,487	167,293	1.8	1.9
Idaho	18,491	27,083	0.2	0.3
Illinois	14,724	9,035	0.2	0.1
Indiana	13,083	13,881	0.1	0.2
Iowa	2,246	2,136	1/	1/
Kansas	3,838	1,072	0.1	1/
Kentucky	2,912	1,640	1/	1/
Louisiana	10,245	9,650	0.1	0.1
Maine	14,322	16,716	0.2	0.2
Maryland	6,274	7,997	0.1	0.1
Massachusetts	100,129	79,098	1.1	0.9
Michigan	147,139	146,483	1.6	1.7
Minnesota	7,651	7,181	0.1	0.1
Mississippi	5,440	3,610	0.1	0.1
Missouri	10,480	7,525	0.1	0.1
Montana	0	250	1/	1/
New Hampshire	9,456	11,424	0.1	0.1
New Jersey	42,321	37,492	0.5	0.4
New Mexico	30,930	40,076	0.3	0.5
New York	165,394	166,258	1.8	1.9
North Carolina	27,367	35,961	0.3	0.4
Ohio	31,634	30,905	0.4	0.4
Oklahoma	12,393	8,530	0.1	0.1
Oregon	143,913	193,070	1.6	2.2
Pennsylvania	80,130	103,775	0.9	1.2
Rhode Island	1,342	1,216	1/	1/
South Carolina	51,731	28,379	0.6	0.3
Tennessee	1,993	1,810	1/	1/
Texas	88,289	103,093	1.0	1.2
Utah	13,761	10,531	0.2	0.1
Vermont	8,274	8,190	0.1	0.1
Virginia	35,608	25,893	0.4	0.3
Washington	735,532	933,802	8.2	10.7
West Virginia	13,611	18,638	0.2	0.2
Wisconsin	69,439	69,359	0.8	0.8
United States	8,965,735	8,743,793	100.0	100.0

1/ Less than 0.05 percent.

Source: National Agricultural Statistics Service, USDA.

Table 21--Fruit and edible tree nuts: Season-average prices per unit received by growers, 1989 and 1990

		1989			1990 1/		
Commodity	Unit	Fresh	Processed	All	Fresh	Processed	All
--Dollars--							
Noncitrus: 2/							
Apples, commercial	Pounds	0.139	6/ 107	0.104	7/	7/	0.136
Apricots, 3 States	Tons	676	284	338	590	276	342
Avocados 3/	Tons	1,760	2,290	1,810	7/	7/	7/
Avocados, California 3/	Tons	2,290	2,290	2,290	7/	7/	7/
Bananas, Hawaii	Pounds	0.365	--	0.365	0.390	--	0.390
Cherries, sweet	Tons	932	453	713	1,300	424	896
Cherries, tart	Pounds	0.344	0.140	0.145	7/	7/	7/
Cranberries	Bbls.	--	--	44	--	--	8/
Dates, California	Tons	990	--	990	873	--	873
Figs, California	Tons	--	--	382	--	--	7/
Grapes	Tons	599	271	314	539	247	287
Grapes, California	Tons	592	268	314	523	241	282
Guavas, Hawaii	Pounds	--	0.150	0.150	--	7/	7/
Kiwifruit, California	Tons	400	--	400	674	--	674
Nectarines, California	Tons	--	--	398	--	--	474
Olives, California	Tons	500	488	488	500	461	461
Papayas, Hawaii	Pounds	0.220	0.030	0.194	0.244	0.028	0.215
Peaches	Pounds	0.232	6/ 204	0.163	0.266	6/ 207	0.173
Pears	Tons	336	9/ 220	277	392	9/ 206	296
Pineapples, Hawaii	Tons	408	90	170	385	101	173
Plums, California	Tons	10/	10/	445	10/	10/	603
Pomegranates, California	Tons	10/	10/	273	--	--	--
Prunes, California	Tons	--	779	779	--	7/	7/
Prunes and plums, other States	Tons	289	119	207	250	129	197
Strawberries	Pounds	0.539	0.261	0.471	0.555	0.287	0.472
Citrus: 4/							
Oranges	Box	9.94	8.59	8.90	10.17	6.87	7.80
Tangerines	Box	20.18	5.58	14.92	23.72	4.79	18.07
Grapefruit	Box	7.64	4.47	6.02	11.98	4.45	7.81
Lemons	Box	17.92	1.89	11.73	21.12	3.13	14.96
Limes	Box	21.60	3.18	17.18	21.20	2.30	13.87
Tangelos	Box	10.10	7.25	8.26	9.90	4.90	6.79
Temples	Box	9.00	6.95	7.43	19.50	6.05	7.44
Tree Nuts:							
Almonds, California 5/	Pounds	--	--	1.02	--	--	0.85
Hazelnuts, 2 States	Tons	--	--	820	--	--	781
Macadamia nuts, Hawaii	Pounds	--	--	0.89	--	--	0.85
Pistachios	Pounds	--	--	1.63	--	--	1.09
Pecans, all	Pounds	--	--	0.715	--	--	1.140
Improved	Pounds	--	--	0.786	--	--	1.200
Native and seedling	Pounds	--	--	0.538	--	--	0.821
Walnuts, 2 States	Tons	--	--	1,070	--	--	7/

-- = Not available.

1/ Preliminary. 2/ Fresh fruit prices are equivalent returns at packinghouse-door for Washington and Oregon, equivalent first delivery point returns for California, and prices as sold for other States. Processing fruit prices for all States are equivalent returns at processing plant door. 3/ 1989, indicated 1989/90. 4/ Equivalent packinghouse-door returns 1989, indicated 1988/89. 5/ Shelled basis. 6/ Dollars per ton. 7/ Data available July 9, 1991. 8/ Data available August 20, 1991. 9/ Processed mostly canned, but includes small quantities of dried and other uses. 10/ Missing data are not published to avoid disclosure of individual operations.

Source: National Agricultural Statistics Service, USDA.

Table 22--U.S. monthly price received by growers, 1989-91

Items	Units	Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
NONCITRUS FRUITS:															
Apples, fresh	\$/lb.	1989	0.181	0.179	0.165	0.144	0.135	0.108	0.115	0.159	0.167	0.143	0.133	0.121	
		1990	0.122	0.124	0.123	0.120	0.126	0.137	0.202	0.224	0.224	0.245	0.195	0.205	0.211
		1991	0.201	0.207											
Pears, fresh	\$/tons	1989	336.00	362.00	368.00	350.00	397.00	491.00	375.00	295.00	331.00	347.00	299.00	285.00	
		1990	303.00	345.00	357.00	370.00	438.00	589.00	430.00	290.00	385.00	368.00	386.00	361.00	
		1991	356.00	382.00											
Peaches, fresh	\$/lb.	1989	---	---	---	---	0.266	0.220	0.196	0.223	0.266	0.225	---	---	
		1990	---	---	---	---	0.292	0.244	0.273	0.250	0.246	---	---	---	
		1991	---	---	---										
Strawberries, fresh	\$/lb.	1989	0.830	0.935	0.677	0.448	0.350	0.560	0.311	0.350	0.650	0.950	1.750	1.200	
		1990	0.980	0.832	0.768	0.508	0.358	0.452	0.402	0.600	0.550	0.950	1.250	0.776	
		1991	1.250	1.290											
CITRUS 1/:															
Oranges-- Fresh	\$/box	1989	6.91	6.18	6.58	6.88	8.71	9.90	10.36	9.76	9.96	9.55	9.55	8.38	
		1990	9.65	8.32	7.71	7.33	9.66	9.75	8.39	8.21	6.72	7.93	9.13	10.16	
		1991	16.93	14.83											
Processing	\$/box	1989	6.45	6.50	6.09	7.39	8.33	8.17	2.54	2.12	1.70	1.56	2.47	4.94	
		1990	4.50	4.83	5.36	7.13	6.98	3.10	3.29	1.01	3.35	2.28	5.86	5.23	
		1991	5.88	4.42											
All	\$/box	1989	6.51	6.45	6.26	7.29	8.39	8.51	7.27	6.52	6.54	6.29	6.28	5.75	
		1990	4.95	5.52	6.04	7.19	7.82	7.13	6.00	4.71	5.31	4.48	6.31	6.18	
		1991	6.62	5.98											
Grapefruit-- Fresh	\$/box	1989	5.41	5.12	5.11	5.80	6.22	6.58	9.23	10.62	10.24	7.78	7.70	9.20	
		1990	10.86	12.00	13.33	12.71	14.36	14.22	10.84	11.08	8.67	8.03	7.24	7.98	
		1991	9.16	7.9											
Processing	\$/box	1989	3.14	3.24	3.26	2.76	2.04	-1.04	-1.14	-1.22	-0.81	1.13	1.66	2.21	
		1990	2.99	3.62	3.82	1.99	-0.75	-0.25	-0.34	-0.38	-0.35	1.12	1.15	1.80	
		1991	1.55	1.71											
All	\$/box	1989	4.41	4.00	3.84	4.26	4.35	3.68	5.91	6.75	7.81	6.01	5.87	6.54	
		1990	5.04	5.50	7.35	7.57	7.82	8.74	6.35	6.44	7.22	6.51	5.53	5.63	
		1991	5.66	4.50											
Lemons-- Fresh	\$/box	1989	9.39	10.58	12.30	13.50	16.20	18.80	20.20	21.54	23.06	21.82	15.71	12.01	
		1990	13.11	15.32	17.04	17.44	18.04	19.24	19.94	16.28	15.10	18.90	12.73	9.69	
		1991	21.08	19.89											
Processing	\$/box	1989	-0.99	-0.97	-0.92	-0.90	-0.88	-0.88	-0.88	-0.80	-0.75	-0.74	-0.46	0.00	
		1990	0.22	0.32	0.36	0.36	0.36	0.44	0.50	0.70	0.57	0.57	0.57	0.43	
		1991	0.37	-0.05											
All	\$/box	1989	4.29	4.75	5.88	8.05	11.99	14.97	15.60	16.70	17.16	14.91	9.25	6.90	
		1990	8.84	9.70	10.07	11.10	12.20	12.97	13.33	10.48	10.34	11.68	6.34	4.59	
		1991	6.83	9.41											
Tangerines-- Fresh	\$/box	1989	18.33	17.44	15.41	14.33	11.46	11.46	---	---	---	28.28	23.90	20.08	
		1990	24.98	22.83	14.59	13.72	14.22	---	---	---	---	23.60	21.43	24.63	
		1991	30.86	22.35											
Processing	\$/box	1989	3.53	4.04	3.31	2.83	0.34	0.34	---	---	---	0.42	0.78	1.65	
		1990	2.68	3.58	2.78	1.69	1.87	1.87	---	---	---	0.75	1.70	2.46	
		1991	3.62	3.25											
All	\$/box	1989	12.57	12.42	10.31	10.15	3.78	3.37	---	---	---	21.97	19.53	14.64	
		1990	14.85	19.43	11.25	9.92	5.99	1.87	---	---	---	15.70	15.61	14.59	
		1991	23.43	16.17											

--- = Insufficient marketing to establish price.

1/ Equivalent on-tree returns.

Source: National Agricultural Statistics Service, USDA.



Table 23--Selected citrus all price, on-tree returns, by month, 1987-91

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
--Dollars per box--												
Oranges:												
Arizona												
1987	4.09	2.74	3.03	3.28	4.05	3.37	2.22	---	---	19.69	11.40	7.40
1988	6.60	5.67	5.36	5.92	5.35	1.12	1.80	---	---	13.94	13.19	10.44
1989	6.32	5.30	7.37	3.94	4.03	6.37	6.25	---	---	---	9.86	7.74
1990	8.57	8.53	6.85	5.89	6.01	5.11	2.43	---	---	---	15.88	11.11
1991	17.90	12.97										
Florida												
1987	4.45	4.83	5.64	5.83	6.05	6.54	---	---	---	---	7.53	6.33
1988	6.46	6.87	8.39	8.41	8.81	9.01	---	---	---	---	6.69	6.52
1989	6.68	6.91	7.05	7.94	8.83	9.27	---	---	---	---	4.96	5.50
1990	4.71	5.29	6.31	8.48	8.57	---	---	---	---	5.94	7.85	7.58
1991	6.31	6.11										
California												
1987	5.78	4.76	4.61	4.20	5.86	6.18	6.05	5.41	7.43	10.42	10.69	6.19
1988	6.20	5.05	4.75	5.61	8.84	8.02	6.49	5.44	5.56	3.13	5.28	8.10
1989	5.40	4.49	4.90	5.24	6.52	6.66	7.28	6.52	6.54	6.23	7.93	7.03
1990	6.77	6.30	5.57	5.23	7.03	7.18	6.01	4.71	7.11	6.66	10.72	10.97
1991	10.28	5.33										
Texas												
1987	4.79	3.89	3.44	9.93	---	---	---	---	---	9.86	8.92	8.12
1988	6.37	6.94	6.56	7.02	7.24	---	---	---	---	8.36	7.85	6.94
1989	6.12	5.97	5.46	5.29	3.03	---	---	---	---	8.98	8.48	5.33
1990	3.96	2.43	---	---	---	---	---	---	---	---	---	---
1991	---	---										
Grapefruit:												
Arizona												
1987	3.45	2.78	1.69	0.95	3.36	3.27	0.95	5.65	3.91	5.61	3.91	4.01
1988	3.93	2.84	2.24	2.62	3.08	2.43	-0.17	---	---	6.44	2.70	3.44
1989	2.49	2.02	2.94	2.76	2.95	2.64	-0.86	---	11.32	6.14	4.07	4.29
1990	8.01	9.32	11.26	9.45	6.86	4.53	---	---	---	---	6.78	6.26
1991	3.77	5.69										
Florida												
1987	4.69	4.72	4.67	4.87	5.22	6.24	---	---	---	9.17	6.23	5.79
1988	5.58	5.50	5.19	5.20	5.12	---	---	---	---	---	7.78	5.26
1989	4.47	4.47	4.14	4.00	4.45	4.69	---	---	7.52	5.90	5.53	6.81
1990	4.89	5.33	6.87	5.94	---	---	---	---	9.82	7.35	7.29	7.22
1991	5.61	4.44										
California												
1987	5.66	4.53	4.41	3.60	4.13	4.59	5.53	4.30	4.47	5.32	8.58	6.24
1988	5.84	5.51	4.07	3.39	3.71	3.97	5.01	5.46	5.26	5.32	5.93	6.67
1989	5.53	2.80	2.88	3.23	3.13	3.99	5.99	6.75	7.90	7.30	8.05	7.77
1990	9.83	8.48	9.29	8.06	8.11	8.82	6.35	6.44	5.13	3.30	5.88	8.75
1991	7.17	5.23										
Texas												
1987	5.39	5.12	5.69	4.47	7.00	---	---	---	---	9.69	8.90	7.68
1988	5.50	4.92	4.08	3.93	4.05	---	---	---	---	7.51	7.36	6.15
1989	3.95	3.02	1.98	2.34	3.18	---	---	---	---	7.88	7.13	5.39
1990	3.55	---	---	---	---	---	---	---	---	---	---	---
1991	---	---										
Lemons:												
Arizona												
1987	0.83	0.47	-0.09	-0.78	-2.32	---	---	---	10.77	9.62	6.96	3.63
1988	1.58	2.29	5.72	-1.28	---	---	---	---	12.13	8.61	5.78	3.98
1989	2.92	1.53	4.38	---	---	---	---	---	18.54	16.39	9.98	6.47
1990	6.41	6.24	---	---	---	---	---	---	17.27	14.61	7.21	5.83
1991	9.08	5.79										
California												
1987	2.36	2.98	3.38	3.44	5.01	8.58	10.76	12.26	8.94	7.74	3.99	2.74
1988	1.64	2.27	5.92	6.58	8.04	12.09	13.42	16.12	12.21	6.71	5.74	4.67
1989	4.82	5.11	5.91	8.05	11.99	14.97	15.60	16.70	16.56	14.02	8.62	7.41
1990	9.51	9.94	10.07	11.10	12.20	12.97	13.33	13.44	13.26	14.74	10.23	8.60
1991	6.17	11.06										
Tangerines:												
Arizona												
1987	12.36	7.40	6.20	-5.22	-1.48	---	---	---	---	---	13.38	14.54
1988	14.89	10.82	11.22	5.12	23.12	---	---	---	---	---	10.46	15.60
1989	16.59	12.10	8.00	2.56	---	---	---	---	---	13.32	11.99	17.18
1990	17.04	10.60	9.07	---	---	---	---	---	---	---	18.12	15.19
1991	22.86	17.98										
Florida												
1987	8.25	8.75	8.96	13.36	---	---	---	---	---	19.90	18.59	11.61
1988	10.13	11.72	13.44	15.59	---	---	---	---	---	18.51	15.45	12.98
1989	10.32	12.07	11.60	14.55	---	---	---	---	---	22.84	19.05	12.79
1990	13.11	20.09	11.62	---	---	---	---	---	---	18.44	16.62	16.94
1991	22.93	16.48										
California												
1987	11.79	10.64	7.05	6.08	9.34	---	---	---	---	---	40.02	24.15
1988	12.69	15.69	10.74	6.84	2.74	2.17	1.71	---	---	---	28.16	17.61
1989	15.72	13.00	9.25	7.31	3.78	3.37	---	---	---	---	27.22	18.87
1990	17.02	21.82	11.33	9.92	5.99	1.87	---	---	---	---	26.42	20.01
1991	27.27	11.82										

-- = Insufficient marketing to establish price.

Source: National Agricultural Statistics Service, USDA.

Table 24--Selected citrus all prices, packinghouse-door returns, by month, 1987-91

Item	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
---Dollars per box---												
<b>Oranges:</b>												
Arizona												
1987	5.74	4.40	4.73	4.98	5.75	5.07	3.92	---	---	21.41	13.14	9.13
1988	8.33	7.42	7.12	7.68	7.11	2.88	3.56	---	---	15.64	14.89	12.14
1989	8.02	7.05	9.17	5.74	5.83	8.17	8.05	---	---	---	11.62	9.50
1990	10.33	10.32	8.65	7.69	7.81	6.91	4.23	---	---	---	15.88	11.11
1991	19.62	14.69										
Florida												
1987	6.45	6.83	7.64	7.83	8.05	8.54	---	---	---	---	9.28	8.08
1988	8.21	8.62	10.14	10.16	10.56	10.76	---	---	---	---	8.54	8.37
1989	8.53	8.76	8.90	9.79	10.68	11.12	---	---	---	---	6.81	7.35
1990	6.56	7.14	8.16	10.33	10.42	---	---	---	---	5.94	7.85	7.58
1991	8.16	7.96										
California												
1987	7.42	6.40	6.25	5.85	7.54	7.88	7.75	7.11	9.13	12.12	12.42	7.92
1988	7.92	6.77	6.47	7.33	10.58	9.78	8.25	7.20	7.32	4.89	7.01	9.77
1989	7.07	6.16	6.58	6.93	8.26	8.45	9.08	8.32	8.34	8.02	9.65	8.73
1990	8.47	8.00	7.28	6.94	8.77	8.96	7.81	6.51	7.11	6.66	10.72	10.97
1991	12.00	7.05										
Texas												
1987	7.19	6.18	5.28	4.82	---	---	---	---	---	11.24	10.01	9.23
1988	7.50	8.05	7.68	8.12	7.24	---	---	---	---	9.47	8.95	8.06
1989	7.25	7.11	6.59	6.42	4.46	---	---	---	---	10.12	9.65	6.48
1990	5.07	3.53	---	---	---	---	---	---	---	---	---	---
1991	---	---										
<b>Grapefruit:</b>												
Arizona												
1987	4.95	4.28	3.19	2.45	4.86	4.87	2.55	---	---	7.21	5.51	5.61
1988	5.53	4.44	3.84	4.22	4.68	4.03	1.43	---	---	8.04	4.30	5.04
1989	4.09	3.62	4.54	4.36	4.55	4.24	0.74	---	12.92	7.74	5.67	5.93
1990	9.65	10.96	12.90	11.09	8.50	6.17	8.91	---	---	---	6.78	6.26
1991	5.50	7.42										
Florida												
1987	6.31	6.35	6.30	6.50	6.84	7.85	---	---	---	10.78	7.85	7.41
1988	7.20	7.13	6.83	6.83	6.74	---	---	---	---	---	9.40	6.87
1989	6.09	6.09	5.76	5.63	6.07	6.32	---	---	9.14	7.51	7.15	8.43
1990	6.53	6.98	8.52	7.58	---	---	---	---	9.82	8.58	7.29	7.22
1991	7.22	6.05										
California												
1987	7.16	6.03	5.88	5.08	5.59	6.08	6.92	5.69	5.85	6.70	10.18	7.84
1988	7.42	7.09	5.64	4.98	5.29	5.51	6.44	6.86	6.64	6.70	7.53	8.25
1989	7.09	4.36	4.45	4.82	4.69	5.44	7.38	8.13	9.28	8.68	9.66	9.35
1990	11.41	10.07	10.91	9.67	9.63	10.26	7.77	7.86	5.13	3.30	5.88	8.75
1991	8.90	6.96										
Texas												
1987	6.56	6.29	6.86	5.66	8.17	---	---	---	---	10.85	9.89	8.70
1988	6.53	5.97	5.15	4.98	5.09	---	---	---	---	8.50	8.36	7.15
1989	4.96	4.06	3.03	3.39	4.16	---	---	---	---	8.98	8.22	6.47
1990	4.59	---	---	---	---	---	---	---	---	---	---	---
1991	---	---										
<b>Lemons:</b>												
Arizona												
1987	3.59	3.23	2.67	1.98	0.43	---	---	---	13.73	12.58	9.92	6.59
1988	4.54	5.25	8.68	1.68	---	---	---	---	15.23	11.71	8.88	7.08
1989	6.02	4.63	7.48	---	---	---	---	---	21.50	19.35	12.94	9.43
1990	9.37	9.20	---	---	---	---	---	---	17.27	14.61	7.21	5.83
1991	12.11	8.82										
California												
1987	5.20	5.82	6.22	6.28	7.85	11.42	13.60	15.14	11.82	10.62	6.87	5.62
1988	4.52	5.15	8.80	9.46	10.92	14.97	16.30	19.12	15.21	9.71	8.74	7.67
1989	7.82	8.11	8.91	11.05	14.99	17.97	18.60	19.80	19.66	17.12	11.72	10.51
1990	12.61	13.04	13.17	14.20	15.30	16.07	16.43	13.44	13.26	14.74	10.23	8.60
1991	9.20	14.09										
<b>Tangerines:</b>												
Arizona												
1987	14.06	9.10	7.90	-3.52	0.22	---	---	---	---	---	15.14	16.30
1988	16.65	12.58	12.98	6.88	24.88	---	---	---	---	---	12.26	17.40
1989	18.39	13.90	9.80	4.36	---	---	---	---	---	15.12	13.79	18.98
1990	18.84	12.40	10.87	---	---	---	---	---	---	---	18.12	15.19
1991	24.66	19.78										
Florida												
1987	11.59	11.85	14.60	15.01	---	---	---	---	---	22.75	21.47	14.52
1988	13.09	14.67	16.34	18.52	---	---	---	---	---	21.12	18.07	15.62
1989	13.05	14.76	14.28	17.21	---	---	---	---	---	25.53	21.74	15.53
1990	15.99	22.88	14.53	---	---	---	---	---	---	18.44	16.62	16.94
1991	25.67	19.21										
California												
1987	13.49	12.34	8.75	7.78	11.04	---	---	---	---	---	41.78	25.91
1988	14.45	17.45	12.50	8.60	4.50	3.93	3.47	---	---	---	29.96	19.41
1989	17.52	14.80	11.05	9.11	5.58	5.17	---	---	---	---	29.02	20.67
1990	18.82	23.62	13.13	11.72	7.79	3.67	---	---	---	---	26.42	20.01
1991	29.07	13.62										

-- = Insufficient marketing to establish price.

Source: National Agricultural Statistics Service, USDA.



Table 25--Apples, commercial crop: Total production and season-average prices received by growers, 1988, 1989, and indicated 1990 production

State and area	Production			Price per pound		
	1988	1989	1990	1988	1989	1990
	--Million pounds--			--Dollars--		
Eastern States:						
Connecticut	38.0	24.0	33.0	0.246	0.243	0.221
Delaware	19.0	15.0	19.5	0.122	0.113	0.150
Georgia	33.0	25.0	22.0	0.131	0.140	0.130
Maine	94.0	69.0	88.0	0.197	0.211	0.199
Maryland	54.0	37.0	38.0	0.122	0.112	0.176
Massachusetts	88.0	78.0	85.0	0.226	0.218	0.201
New Hampshire	57.0	41.0	48.0	0.226	0.231	0.238
New Jersey	65.0	48.0	55.0	0.120	0.153	0.136
New York	910.0	960.0	990.0	0.108	0.104	0.102
North Carolina	350.0	220.0	230.0	0.080	0.088	0.111
Pennsylvania	520.0	320.0	520.0	0.092	0.107	0.110
Rhode Island	6.0	5.5	5.5	0.246	0.244	0.221
South Carolina	38.0	35.0	32.0	0.121	0.120	0.131
Vermont	45.0	45.0	41.0	0.184	0.192	0.210
Virginia	425.0	325.0	210.0	0.111	0.102	0.121
West Virginia	215.0	115.0	145.0	0.095	0.098	0.123
Total	2,957.0	2,362.5	2,562.0			
Central States:						
Arkansas	10.0	9.0	12.0	0.168	0.188	0.191
Illinois	85.0	91.0	60.0	0.163	0.130	0.154
Indiana	56.0	64.0	57.0	0.176	0.187	0.243
Iowa	9.5	11.5	9.6	0.214	0.208	0.240
Kansas	12.0	13.0	8.0	0.176	0.209	0.186
Kentucky	11.0	16.0	9.0	0.158	0.180	0.205
Michigan	830.0	950.0	750.0	0.088	0.082	0.111
Minnesota	14.0	31.0	20.0	0.302	0.278	0.374
Missouri	56.0	55.0	41.0	0.172	0.136	0.165
Ohio	95.0	125.0	120.0	0.177	0.179	0.178
Tennessee	12.5	11.5	8.5	0.156	0.148	0.178
Wisconsin	45.0	65.0	48.0	0.212	0.156	0.215
Total	1,236.0	1,442.0	1,143.1			
Western States:						
Arizona 1/	---	34.0	64.0	---	0.074	0.068
California	630.0	675.0	650.0	0.187	0.150	0.155
Colorado	65.0	70.0	35.0	0.110	0.096	0.163
Idaho	135.0	158.0	165.0	0.140	0.079	0.138
New Mexico	10.0	5.3	6.8	0.195	0.200	0.195
Oregon	155.0	160.0	175.0	0.119	0.050	0.123
Utah	40.0	56.0	24.0	0.125	0.120	0.186
Washington	3,900.0	5,000.0	4,700.0	0.130	0.093	0.141
Total	4,935.0	6,158.3	5,819.8			
United States	9,128.0	9,962.8	9,524.9	0.127	0.104	0.136

1/ Estimates begin with the 1989 crop.

Source: National Agricultural Statistics Service, USDA.

Table 26--Peaches: Total production and season-average prices received  
by growers, 1988, 1989 and indicated 1990 production

State	Production			Price per pound		
	1988	1989	1990	1988	1989	1990
	--Million pounds--			--Cents--		
Alabama	24.0	15.0	12.0	0.202	0.246	0.238
Arkansas	20.0	2.5	18.0	0.150	0.241	0.246
California:						
Clingstone	1,017.0	992.0	1,012.0	0.104	0.107	0.107
Freestone	523.0	528.0	572.0	0.152	0.153	0.168
Colorado	16.0	2/	17.0	0.269	3/	0.356
Connecticut	3.1	4.0	3.6	0.550	0.500	0.470
Delaware	3.1	0.4	0.2	0.213	0.338	0.415
Georgia	140.0	125.0	130.0	0.201	0.202	0.299
Idaho	11.8	4.0	4.7	0.260	0.384	0.217
Illinois	20.0	13.0	0.3	0.240	0.270	0.343
Indiana	3.0	4.0	0.8	0.309	0.322	0.341
Kansas	4.5	2.5	0.1	0.370	0.270	0.230
Kentucky	6.0	2.0	3/	0.280	0.376	3/
Louisiana	6.0	1.4	4.0	0.320	0.360	0.340
Maryland	12.8	7.6	4.0	0.189	0.280	0.327
Massachusetts	2.2	2.1	2.0	0.550	0.500	0.470
Michigan	45.0	55.0	45.0	0.178	0.191	0.210
Mississippi 1/	4.0	1.0	---	0.265	0.400	---
Missouri	11.0	4.5	0.7	0.225	0.270	0.300
New Jersey	85.0	70.0	45.0	0.244	0.346	0.409
New York	14.1	12.5	14.0	0.272	0.294	0.276
North Carolina	36.0	12.0	10.0	0.167	0.175	0.270
Ohio	6.0	8.0	5.5	0.310	0.340	0.380
Oklahoma	26.0	25.0	8.0	0.264	0.275	0.363
Oregon	14.0	14.0	14.5	0.281	0.247	0.299
Pennsylvania	80.0	65.0	76.0	0.196	0.258	0.289
South Carolina	340.0	270.0	110.0	0.185	0.200	0.243
Tennessee	11.0	1.3	1.3	0.297	0.369	0.370
Texas	18.0	14.0	24.0	0.357	0.400	0.350
Utah	12.5	11.0	12.0	0.190	0.215	0.240
Virginia	29.0	15.0	2.5	0.147	0.213	0.315
Washington	50.0	44.0	53.0	0.193	0.255	0.255
West Virginia	20.0	9.0	3.0	0.169	0.256	0.268
United States	2,614.1	2,334.8	2,205.2	0.156	0.163	0.173

1/ Estimates discontinued after the 1989 crop.

2/ No significant commercial production in 1989 due to frost.

3/ No significant commercial production in 1990 due to frost.

Source: National Agricultural Statistics Service, USDA.

Table 27--Pears: Utilized production, by State and Pacific Coast, variety composition, 1988-90

State	1988	1989	1990	Pacific Coast	1988	1989	1990
--Short tons--				--Short tons--			
California	302,000	315,000	332,000	Washington:			
Colorado	3,700	4,000	2,500	Bartlett	147,000	157,000	177,000
Connecticut	1,600	1,150	1,050	Other	163,000	192,000	195,000
Michigan	6,000	8,000	2,500	Total	310,000	349,000	372,000
New York	17,300	16,300	14,600	Oregon:			
Oregon	213,000	215,000	228,000	Bartlett	68,000	67,000	83,000
Pennsylvania	4,800	5,400	3,200	Other	145,000	148,000	145,000
Utah	2,000	2,600	2,800	Total	213,000	215,000	228,000
Washington	310,000	349,000	372,000	California:			
United States	860,400	916,450	958,650	Bartlett	291,000	298,000	314,000
				Other	11,000	17,000	18,000
				Total	302,000	315,000	332,000
				3 States:			
				Bartlett	506,000	522,000	574,000
				Other	319,000	357,000	358,000
				Total	825,000	879,000	932,000

Source: National Agricultural Statistics Service, USDA.

Table 28--Fruit for processing: Season-average price per ton received by growers for selected noncitrus fruit, by type of use, and principal State, 1988-90 1/

Fruit, use, & States	1988	1989	1990	Fruit, use, & States	1988	1989	1990
--Dollars--				--Dollars--			
Apricots:				Grapes--California (cont'd):			
Canning				Dried (fresh basis)	180.00	227.00	200.00
California	282.00	280.00	274.00	Wine	253.00	297.00	269.00
Freezing				Peaches, clingstone:			
California	294.00	310.00	305.00	Canning			
Drying				California	212.00	220.00	217.00
California (fr. basis)	314.00	296.00	287.00	Peaches, freestone:			
Cherries, tart:				Canning			
Processing, all				California	181.00	192.00	204.00
New York	444.00	286.00	2/	Freezing			
Pennsylvania	452.00	272.00	2/	California	165.00	167.00	178.00
Michigan	356.00	290.00	2/	Drying			
Wisconsin	212.00	120.00	2/	California (fr. basis)	117.00	110.00	108.00
Cherries, sweet:				Pears, Bartlett:			
Processing, all				Canning			
Oregon	579.00	508.00	518.00	Washington	184.00	222.00	214.00
Michigan	512.00	398.00	358.00	California	218.00	260.00	231.00
Washington	386.00	406.00	310.00	Drying			
Canning				California (fr. basis)	147.00	146.00	126.00
Washington	644.00	611.00	604.00	Prunes and plums:			
Oregon	660.00	680.00	660.00	Canning			
Michigan	512.00	398.00	358.00	Michigan	3/	117.00	3/
Brining				Prunes:			
Washington	391.00	450.00	420.00	Drying (fresh basis)			
Michigan	512.00	398.00	358.00	California	251.00	233.00	2/
Oregon	555.00	475.00	470.00				
Grapes--California							
All processing	224.00	268.00	241.00				

1/ Prices are basis bulk fruit at first delivery point for all California fruits except prunes and pears for drying and processed grapes. Prices for California prunes and pears for drying and grapes and for fruits in other States are equivalent processing plant-door returns. 2/ Data available July 9, 1991. 3/ Missing data are not published to avoid disclosure of individual operations.

Source: National Agricultural Statistics Service, USDA.



Table 29--Fresh fruit: Consumer price indexes, United States, by month, 1986-91

Item and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
--1982-1984=100--												
Apples:												
1986	115.7	120.5	120.9	122.8	129.9	139.9	146.0	168.0	151.9	119.3	115.5	116.9
1987	123.7	125.8	135.6	136.1	139.0	151.1	158.6	151.3	129.5	113.6	103.5	103.6
1988	109.3	116.4	119.4	121.7	121.9	127.9	144.7	178.6	167.7	139.2	131.2	132.4
1989	138.8	144.2	145.5	143.4	142.8	145.5	145.3	153.4	144.6	132.1	125.4	124.7
1990	130.3	136.9	139.8	138.7	140.4	146.8	156.8	168.1	164.9	148.0	147.2	151.6
1991	157.5											
Bananas:												
1986	92.3	103.1	110.4	125.8	125.9	101.6	101.0	100.1	104.6	102.3	101.3	91.8
1987	100.8	107.2	107.0	108.2	101.6	111.7	100.0	104.8	103.8	100.2	97.4	107.4
1988	107.2	119.6	118.9	121.4	119.6	144.7	122.7	112.0	110.4	118.6	119.9	115.9
1989	112.7	119.5	131.4	143.4	155.1	139.5	133.7	126.6	126.4	127.5	127.2	122.6
1990	126.4	146.0	149.9	144.6	137.6	132.4	160.4	137.2	138.6	129.0	127.6	128.3
1991	130.8											
Oranges:												
1986	103.8	100.3	98.5	101.2	105.5	110.0	114.5	115.2	112.3	115.7	115.4	110.4
1987	114.1	111.2	114.1	112.6	120.0	141.4	152.8	156.8	160.3	166.8	154.8	126.3
1988	122.3	121.3	124.4	126.5	143.7	149.5	155.7	157.5	164.5	169.8	155.5	144.4
1989	131.1	126.1	128.6	130.3	136.2	154.3	165.2	168.9	165.6	167.5	151.5	138.5
1990	148.9	158.9	158.7	154.3	158.1	171.7	171.2	170.1	168.4	156.0	158.5	152.7
1991	205.7											

Source: Bureau of Labor Statistics, U.S. Department of Labor.

Table 30--Fresh fruit: Retail price, marketing spreads, and grower-packer return per pound sold in the Northeast and North Central regions, indicated month, 1989 and 1990

Region, commodity, and month	Retail price	Marketing spreads		Grower-packer return 1/ (f.o.b. shipping point price)	
		Absolute	Percent of retail price	Absolute	Percent of retail price
	--Cents--		Percent	Cents	Percent
<b>NORTHEAST</b>					
Apples, Washington Red Delicious:					
December 1989	69.5	47.7	69	21.8	31
December 1990	84.5	49.3	58	35.2	42
November 1990	79.8	45.1	57	34.7	43
Grapefruit, Florida white seedless:					
December 1989	43.6	29.7	68	13.9	32
December 1990	51.7	36.0	70	15.7	30
November 1990	52.4	37.0	71	15.4	29
Lemons, California:					
December 1989	102.5	68.3	67	34.2	33
December 1990	100.0	74.0	74	26.0	26
November 1990	106.3	78.8	74	27.5	26
Oranges, California valencia:					
October 1989	61.5	40.6	66	20.9	34
October 1990	56.8	38.5	68	18.3	32
September 1990	61.0	41.9	69	19.1	31
<b>NORTH CENTRAL</b>					
Apples, Washington Red Delicious:					
December 1989	57.4	35.6	62	21.8	38
December 1990	79.8	44.6	56	35.2	44
November 1990	75.1	40.4	54	34.7	46
Grapefruit, Florida white seedless:					
December 1989	49.3	35.4	72	13.9	28
December 1990	58.4	42.7	73	15.7	27
November 1990	56.0	40.6	73	15.4	27
Lemons, California:					
December 1989	100.4	66.2	66	34.2	34
December 1990	101.7	75.7	74	26.0	26
November 1990	106.1	78.6	74	27.5	26
Oranges, California valencia:					
October 1989	59.9	39.0	65	20.9	35
October 1990	53.3	35.0	66	18.3	34
September 1990	57.7	38.6	67	19.1	33

1/Adjusted to account for loss incurred during marketing due to waste and spoilage.

Sources: Bureau of Labor Statistics, Department of Labor, and Economic Research Service, USDA

Table 31--Fresh fruit: Representative truck rates for selected fruits, 1990 1/

Commodity and shipping points	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Dollars per package												
Apples (tray packed ctn.)												
Washington, Central to:												
Atlanta	2.88	2.88	2.90	2.90	2.38	2.75	2.75	2.80	2.85	2.85	2.85	2.85
Chicago	2.15	2.15	2.15	2.15	2.15	2.10	2.10	2.10	2.13	2.10	2.10	2.10
Dallas	2.33	2.35	2.35	2.35	2.38	2.33	2.33	2.23	2.23	2.30	2.30	2.30
Denver	1.60	1.60	1.60	1.60	1.55	1.55	1.55	1.55	---	---	1.65	1.65
Los Angeles	1.60	1.60	1.60	1.60	1.55	1.55	1.60	1.48	1.55	1.65	---	---
New York City	3.43	3.43	3.35	3.40	3.38	3.30	3.30	3.30	3.30	3.40	3.40	3.40
New York, Eastern to:												
Atlanta	1.25	1.25	1.25	1.25	---	---	---	---	---	1.25	1.25	1.25
New York City	0.58	0.58	0.58	0.58	---	---	---	---	---	0.58	0.58	0.58
W. Virginia and Virginia to:												
Atlanta	1.00	0.90	0.90	0.95	---	---	---	---	---	0.95	0.95	0.95
New York City	0.80	0.80	0.80	0.80	---	---	---	---	---	0.80	0.80	0.80
Grapefruit (4/5 bu. ctn.)												
Florida to:												
Atlanta	0.55	0.65	0.65	0.65	---	---	---	---	---	---	---	---
Chicago	1.30	1.28	1.25	1.25	---	---	---	---	---	1.20	1.20	1.28
New York City	1.28	1.28	1.25	1.25	---	---	---	---	---	1.20	1.20	1.30
Grapes (23 lb. lug)												
California, Kern District to:												
Atlanta	1.41	1.26	1.26	1.18	1.18	1.47	1.79	1.65	1.35	1.41	1.35	1.29
Chicago	1.24	1.24	1.15	1.15	1.12	1.41	1.82	1.53	1.15	1.15	1.15	1.15
Dallas	0.91	0.91	0.88	0.82	0.88	0.97	1.24	1.09	1.00	0.94	0.88	0.94
New York City	1.91	1.85	1.68	1.62	1.79	2.15	2.59	2.09	1.85	1.85	1.82	1.76
Citrus (7/10 bu. ctn.)												
California, Southern to:												
Atlanta	2.15	2.15	2.00	2.00	2.05	2.50	3.10	2.65	2.35	2.30	2.35	2.25
Chicago	2.00	2.00	1.95	1.95	1.90	2.30	2.85	2.35	1.85	2.10	1.95	2.05
Dallas	1.65	1.65	1.50	1.50	1.50	1.80	2.15	1.70	1.70	1.55	1.65	1.60
New York City	3.20	3.20	2.80	2.90	3.00	3.55	4.30	3.50	3.20	3.15	3.15	3.15
Oranges (4/5 bu. ctn.)												
Florida to:												
Atlanta	0.55	0.65	0.65	0.65	---	---	---	---	---	---	---	---
Chicago	1.40	1.33	1.28	1.33	---	---	---	---	---	1.23	1.25	1.33
New York City	1.33	1.28	1.28	1.33	---	---	---	---	---	1.25	1.25	1.33

--- = Not available.

1/Reported from sample of shippers and/or truck brokers in specified areas for shipments during the first week of each month.

Source: Fruit and Vegetable Truck Rate Report, AMS, USDA.



# Cost of Producing Oranges and Grapefruit, 1988/89

by  
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**Abstract:** Cost of production data were collected in March 1990 for oranges and grapefruit in the two leading citrus States of Florida and California as part of the United States Department of Agriculture's (USDA) Farm Costs and Returns Survey. Results indicate that for the 1988/89 season, cash receipts per acre minus both variable and fixed cash expenses and capital replacement was positive for both oranges and grapefruit in both States. Returns above full economic costs were negative for grapefruit in California, but positive for grapefruit in Florida and oranges in both States. Full economic cost for grapefruit was estimated to be \$6.82 per 64-pound box in California and \$5.00 per 85-pound box in Florida. Cost for oranges was estimated to be \$7.29 per 75-pound box in California and \$7.48 per 90-pound box in Florida.

**Keywords:** Florida citrus, California citrus, oranges, grapefruit, costs of production, citrus budgets.

## Introduction

Cost-of-production (COP) information for the 1988/89 orange and grapefruit crops were collected in March 1990 for the first time by the U.S. Department of Agriculture as part of its Farm Costs and Returns Survey (FCRS). The FCRS is conducted annually by the USDA's Economic Research Service (ERS) and the National Agricultural Statistics Service (NASS). The FCRS is personally enumerated for a random probability sample of all U.S. farms and includes farms growing selected crops on which detailed COP data are collected. In March of 1990, COP questionnaires were obtained from a sample of orange and grapefruit grove operations in Florida and California, the two major citrus producing States.

For the 1988/89 crop year, 13.2 million tons of citrus were produced in the United States on over 847,500 bearing acres. The farm value of this fruit was \$2.27 billion. Oranges and grapefruit accounted for 85 percent of this total

value of production and Florida and California accounted for 96 percent of the total value.

## Estimated Costs of Production

The budgets reported here are calculated on a per acre basis. They are based on the total acreage for the FCRS sample of orange and grapefruit operations and include bearing and non-bearing trees. Therefore, the per acre COP estimates represent the costs associated with both bearing and nonbearing trees, and the revenues from the fruit sales are spread over the total bearing and nonbearing acreage. To the extent that the mix of bearing and nonbearing acres in 1988/89 represent the long-term mix of trees needed to maintain productive groves, the estimated cost for the 1988/89 production would represent long-run COP.

In Florida, 56 percent of the orange acres in the survey had bearing trees while 44 percent had nonbearing trees. For grapefruit 86 percent of the acres had bearing trees while 14 percent had nonbearing trees. A relatively high percentage of the Florida orange acreage surveyed had nonbearing trees. This was the result of frequent freezes in Florida during the 1980's (which especially effected oranges) and the subsequent replacement of trees killed by the freeze. An expansion of new orange acres also added new, nonbearing trees.

This high proportion of nonbearing trees is likely higher than needed to maintain orange groves in the long run. In California the mix of bearing and nonbearing acres was 95 and 5 percent, respectively, for oranges and 94 and 6 percent, respectively, for grapefruit.

## Oranges

In Florida, questionnaires for 64 orange operations were completed on the FCRS. These operations averaged 409 total crop acres of which 131 were either Valencia or early, midseason, or navel oranges. In California, 109 questionnaires were completed. These operations averaged 139 total crop acres of which 38 were either Valencia or navel oranges.

## Gross Revenue

Gross revenue per acre of oranges was calculated by multiplying the 1988/89-season-average price received for all oranges (reported by NASS) by the average yield per acre (calculated from the FCRS). Average yields for all acres (including bearing and nonbearing) were 314 75-pound boxes in California and 175 90-pound boxes in Florida (table A-1). The relatively low yields per total acre in Florida reflect the high proportion of nonbearing acres in that State.

Gross value per acre was estimated at \$2,466 in California and \$1,621 in Flor-

<sup>1</sup> Agricultural Economist, Economic Research Service, U.S. Department of Agriculture. The author expresses appreciation to Jim Smith, National Agricultural Statistics Service, who assisted with pretesting questionnaires and provided valuable reviews. This report presents State COP figures for oranges and grapefruit that are estimated from information collected on the FCRS and other secondary sources including NASS, equipment dealers and manufacturers, and contractors.

Table A-1--Orange cash receipts and production costs per acre, California and Florida, 1988/89

Budget Item	California	Florida
Yield (Boxes/Acre) 1/	314.17	175.09
	--Dollars--	
Price (NASS, per box, 1988/89)	7.85	9.26
Cash receipts	2,466.23	1,621.33
Variable cash expenses:		
Nursery stock, trees, and seed	12.47	13.02
Fertilizer	98.66	141.27
Chemicals and biological pest control	210.73	139.28
Custom operations and rental	43.53	27.07
Fuel, lube, and electricity	143.46	38.47
Repairs	123.31	53.39
Hired labor	589.41	298.99
Purchased irrigation water	97.96	0.30
Interest on operating loans	31.90	18.60
Miscellaneous	106.47	80.60
Total variable expenses	1,457.90	810.99
Fixed cash expenses:		
Real estate and property tax	77.62	72.25
Interest on real estate debt	169.32	32.06
General grove overhead	198.36	86.88
Total fixed expenses	445.30	191.19
Total cash expenses	1,903.20	1,002.18
Capital replacement:		
Vehicles	21.72	12.84
Tractors	14.01	12.92
Equipment	20.02	8.40
Irrigation system:		
Pumps	14.72	18.25
Distribution system	40.64	45.57
Wind machines (regular and PTO)	37.20	0.08
Total capital replacement	148.31	98.06
Cash receipts less cash expenses and capital replacement	414.72	521.09
Economic (full ownership) costs:		
Total variable expenses less interest on operating loans	1,426.00	792.39
General grove overhead	198.36	86.88
Real estate and property tax	77.62	72.25
Capital replacement	148.31	98.06
Allocated returns to owned inputs:		
Return to operating capital	66.61	35.08
Return to other non-land capital	41.27	21.80
Return to land	217.52	173.99
Unpaid labor	116.05	29.85
Total economic costs		
Per/acre	2,291.74	1,310.30
Per/box	7.29	7.48
Cents per pound	9.7	8.3
Returns to management and risk	174.49	311.03

1/ Box weight: California, 75 pounds; Florida, 90 pounds. Yields are total production divided by total acres, both bearing and nonbearing. COP estimates include costs for both bearing and nonbearing acres on sampled operations.



ida. These values are for the 1988/89 season and do not reflect the major Florida freeze that occurred in late December 1989.

### **Variable Cash Expenses**

Total variable cost per acre was estimated at \$1,458 for California and \$811 for Florida. Hired labor was the single largest cash expense in both States, representing 40 percent of total variable cash expenses in California and 37 in Florida. Labor cost include all picking and hauling expenses whether paid directly to workers or indirectly through crew leaders, contractors, cooperatives, or other persons.

Fertilizers and chemicals, including biological pest control, also were major costs in California and Florida. Generally, expenses per acre were higher in California than in Florida. In part this reflects Florida's high proportion of nonbearing trees relative to California and the higher proportion of California oranges that are grown specifically for the fresh market. Fertilizer and chemical costs are lower on nonbearing than on bearing acres. Also fertilizers and chemicals are more extensively used on fruit to be marketed fresh than for fruit to be processed.

### **Fixed Cash Expenses**

Fixed expenses per acre totaled \$445 in California and \$191 in Florida. General grove overhead accounted for about 45 percent of the total fixed cash expense in both States. Interest on real estate debt was significantly higher in California than in Florida, while real estate and property taxes per acre were about the same—\$77 in California and \$72 in Florida.

### **Capital Replacement**

Total capital replacement was estimated at \$148 per acre in California and \$98 in Florida. In both States, capital replacement costs per acre for vehicles, tractors, and equipment were the largest component of capital replacement, with irrigation systems representing almost the same amount.

*Pumps and irrigation systems* are a major investment for orange production. Survey results indicated that wells

accounted for an estimated 38 percent of the water used on orange crops in California and 73 percent in Florida. The smaller proportion of well water used in California reflects the relative importance of water purchased from irrigation districts.

Drilling costs per well were calculated on the basis of information on the average well depth and casing diameter from the FCRS and on secondary drilling-cost information from companies in both States. The cost for an average well was estimated at \$6,700 in California and \$12,400 in Florida. The number of wells on orange and grapefruit operations was obtained from the FCRS.

The most common irrigation systems in Florida are micro-sprinklers. This type of water distribution system is used on about 58 percent of the orange operations there. Solid set sprinklers (placed either over or under the trees) accounted for 26 percent of the Florida orange operations while drip irrigation (6 percent) and gravity flow systems (8 percent) represented a much smaller portion of the systems in use. In contrast, only 11 percent of California operations reported the use of micro-sprinkler irrigation systems, with 29 percent reporting the use of solid set sprinklers (placed under the trees). About 28 percent of California operations reported the use of gravity flow irrigation systems, in sharp contrast to Florida where less than 8 percent reported use of these systems. Hand-moved sprinklers accounted for over 16 percent of the systems reported in California while none were reported in Florida. Drip irrigation accounted for about 10 percent in California, compared to 6 percent in Florida.

Capital replacement costs for pumps used in the well only (assuming zero salvage value and a 12-year useful life) were about \$15 per acre in California and \$18 in Florida. Capital replacement costs for distribution systems, including booster pumps, was estimated at about \$41 in California and \$46 in Florida.

*Wind machines* for frost protection were reported by about 60 percent of the operations in California. In sharp contrast, wind machines are not extensively used in Florida and only one operation reported having any. Capital replacement costs for wind machines was cal-

culated from FCRS information and from secondary sources on the new cost for tower-mounted wind machines powered by gas, propane, diesel, and tractor power-take-off mechanisms. Capital replacement for wind machines was estimated at \$37 per acre in California.

### **Return Above Expenses**

Cash receipts, less variable and fixed cash expenses and capital replacement costs, left a positive \$415 per acre in California and \$521 in Florida.

### **Full Economic Costs**

Interest on operating loans and real estate debt were subtracted from the sum of total cash expenses and capital replacement. Then allocated returns to owned inputs (including operating capital, other nonland capital, land and wells, and unpaid labor) were added to provide an estimate of the total economic cost for producing oranges. (For more detail, including the rate of return used, see the appendix.)

Returns to operating capital, other nonland capital, and land and wells were calculated by multiplying their average values by 2.8 percent, the 10-year-average return. The return to land and wells was \$174 per acre in Florida and \$217 in California. The average value of land per acre reported on the FCRS was \$7,590 (\$7,720 including wells) in California and \$5,995 (\$6,215 including wells) in Florida. The estimated return per acre for operating and other nonland capital was \$35 and \$22, respectively, in Florida and \$67 and \$41, respectively, in California. Unpaid labor, valued at \$5 per hour in both States, was estimated at \$30 per acre in Florida and \$116 in California. This reflects the tendency of larger Florida operations to spread unpaid family labor over more acres.

Total economic costs in Florida were \$1,310 per acre or \$7.48 per 90-pound box and \$2,292 in California or \$7.29 per 75-pound box. Subtracting the full economic cost from cash receipts left a positive return to management and risk of \$311 in Florida and \$174 in California.



## Grapefruit

Questionnaires for 40 of Florida's grapefruit operations were completed for the FCRS. These operations averaged 4,297 total crop acres of which 510 were grapefruit. In Florida, 14 percent of the grapefruit acres had trees of non-bearing age, with the remaining 86 percent of the acres having bearing trees.

In California, 39 questionnaires were completed. These operations averaged 111 total crop acres of which 22.5 were grapefruit. In California, 6 percent of the grapefruit acres had trees of non-bearing age, and 94 percent had bearing trees.

### Gross Revenue

Gross revenue per acre was calculated by multiplying the 1988/89-season-average price received for all grapefruit (reported by NASS) by the average yield per acre reported on the FCRS. Average yields for total acreage (including bearing and nonbearing acres) were 357, 64-pound boxes in California and 381, 85-pound boxes in Florida (table A-2).

Gross value per acre was estimated at \$2,293 in California and \$2,318 in Florida. These values are for the 1988/89 season and do not reflect the impact of Florida's major freeze in late December 1989.

### Variable Cash Expenses

Total variable cost per acre was estimated at \$1,590 for California and \$1,442 for Florida. Hired labor was the single largest cash expense in both States, representing 43 percent of the total variable cash expenses in California and 53 in Florida.

Fertilizers and chemicals, including biological pest control, also were major costs in both States, but especially Florida. Expenses per acre for fertilizer and chemicals were over 2.5 times higher in Florida than in California.

Variable cash expenses per acre for purchased irrigation water, custom operations and rental, fuel, lube, and electricity, and miscellaneous expenses were all much higher in California than in Florida.

## Fixed Cash Expenses

Fixed expenses per acre totaled \$318 per acre in California and \$350 in Florida. General grove overhead accounted for about 39 percent of the total in both States. Interest on real estate debt was about the same in California and Florida while real estate and property taxes were estimated at \$45 in California and \$64 in Florida.

### Capital Replacement

Total capital replacement was estimated at \$136 per acre in California and \$62 in Florida. Capital replacement costs per acre for vehicles, tractors, and grove equipment was about three times higher in California than in Florida, reflecting more owned machinery on California operations. Capital replacement costs for irrigation distribution systems were about equal in both States.

*Pumps and irrigation systems* are a major investment for grapefruit production. Survey results indicated that wells accounted for an estimated 20 percent of the water used on grapefruit in California and 52 percent in Florida. As with oranges, the smaller proportion of water from wells in California -- compared to Florida -- reflects the relative importance of purchased water from irrigation districts.

Drilling costs per well were calculated on the basis of information on the average well depth and casing size from the FCRS and on secondary information from drilling companies in both States. The cost per well was estimated at \$17,400 for California and \$14,500 for Florida. Survey results indicate that wells in California are more than twice as deep on grapefruit operations than on orange operations. This is likely the result of physical location as the two crops are concentrated in geographically different areas of the State. In Florida, wells on grapefruit operations were estimated to be about 100 feet deeper than on orange operations. The number of wells on grapefruit and orange operations was also obtained from the FCRS.

The most common irrigation systems in Florida were micro-sprinklers. This type of water distribution system was used on about 65 percent of the grape-

fruit operations there. Gravity flow irrigation systems accounted for another 20 percent in Florida, while drip irrigation (6 percent) and solid set sprinklers (placed either over or under the trees), represented a relatively small portion (8 percent) of the irrigation systems. In contrast only 19 percent of the operations in California reported use of the micro-sprinkler irrigation system and 20 percent reported solid set sprinklers (placed under the trees). About 16 percent reported gravity flow irrigation systems, compared to Florida's 20 percent. Hand-moved sprinklers accounted for 16 percent of the systems reported in California, but none were reported in Florida. Drip irrigation accounted for about 24 percent in California, compared to 6 percent in Florida.

Capital replacement costs for pumps used in the well only (assuming zero salvage value and 12-years of useful life), were about \$20 per acre in California and \$8 in Florida. Capital replacement costs for the distribution systems (including booster pumps) were estimated at \$36 in California and \$32 in Florida.

*Wind machines* were reported in California on about 26 percent of the operations, a much smaller proportion than on California orange operations. The difference probably is due to the geographic separation of the crops in the State. In sharp contrast, wind machines for frost protection are not extensively used in Florida -- none of the operations surveyed reported having any. Capital replacement for wind machines was estimated at \$20 per acre in California.

### Return Above Expenses

Cash receipts, less variable and fixed cash expenses and capital replacement costs, left a positive \$249 per acre in California and \$464 in Florida.

### Full Economic Costs

The return to land and wells for grapefruit operations was estimated at \$146 per acre in Florida and \$380 in California. The average value of land per acre reported in the FCRS was \$13,320 (\$13,560 including wells) in California and \$5,125 (\$5,220 including wells) in Florida. The difference between reported land values for California grape-

Table A-2--Grapefruit cash receipts and production costs per acre, California and Florida, 1988/89

Budget Item	California	Florida
Yield (Boxes/Acre) 1/	357.20	381.31
	--Dollars--	
Price (NASS, per box, 1988/89)	6.42	6.08
Cash receipts	\$2,293.22	\$2,318.36
Variable cash expenses:		
Nursery stock, trees, and seed	23.01	33.77
Fertilizer	81.17	157.34
Chemicals and biological pest control	71.76	240.74
Custom operations and rental	156.08	16.75
Fuel, lube, and electricity	145.84	36.44
Repairs	70.32	71.86
Hired labor	685.77	770.03
Purchased irrigation water	176.27	4.04
Interest on operating loans	5.15	22.76
Miscellaneous	174.17	88.49
Total variable cash expenses	1,589.54	1,442.22
Fixed cash expenses:		
Real estate and property tax	45.11	64.41
Interest on real estate	149.65	152.24
General grove overhead	123.05	133.57
Total fixed expenses	317.81	350.22
Total cash expenses	1,907.35	1,792.44
Capital replacement:		
Vehicles	29.72	7.41
Tractors	19.03	11.53
Equipment	11.42	2.45
Irrigation system		
Pumps	19.84	7.81
Distribution system	36.44	32.47
Wind machines (regular and PTO)	19.95	0.00
Total capital replacement	136.40	61.67
Cash receipts less cash expenses and capital replacement	249.47	464.25
Economic (full ownership costs):		
Total variable cash expenses less interest on operating loans	1,584.39	1,419.46
General grove overhead	123.05	133.57
Real estate and property tax	45.11	64.41
Capital replacement	136.39	61.67
Allocated returns to owned inputs:		
Return to operating capital	66.76	62.74
Return to other non-land capital	25.90	10.41
Return to land	379.67	146.12
Unpaid labor (at \$5/hour)	73.61	6.88
Total Economic Costs:		
Per/acre	2,434.88	1,905.26
Per/box	6.82	5.00
Cents per pound	10.7	5.9
Returns to management and risk	(141.66)	413.10

1/ Box weight: California, 64 pounds; Florida, 85 pounds. Yields are total production divided by total acres including both bearing and nonbearing acres. COP estimates include cost for both bearing and nonbearing acres on sample operations.



fruit and oranges likely reflects the geographically different locations of the two crops. The estimated return per acre for operating and other nonland capital was \$63 and \$10, respectively, in Florida and \$67 and \$26, respectively, in California. Unpaid labor, valued at \$5 per hour in both States, was estimated at \$7 per acre in Florida and \$74 in California, reflecting the tendency of larger Florida operations to spread unpaid labor over more acres.

Total economic costs in Florida were \$1,905 per acre, or \$5.00 per 85-pound box, and \$2,435 in California, or \$6.82 per 64-pound box. After subtracting the full economic costs from cash receipts, a positive return to management and risk of \$413 per acre was realized for Florida operations, but a negative return of \$142 resulted in California.

## Appendix

### Definitions and Assumptions

**Fertilizer** includes the cost of all fertilizer, lime, soil conditioners, micronutrients, and secondary nutrients applied to the citrus crop. Also included is the cost of custom application if it was impossible for the operator to separate application and material cost. When they could be separated, custom application of fertilizer was included with the "custom operations and equipment rental" category.

**Chemicals** include the total costs of all chemicals applied to citrus. Included were insecticides, herbicides, fungicides, surfactants, wetting agents, etc. Like fertilizer, application costs were included only if custom application costs could not be separated from the material cost by the operator. Otherwise, custom application costs were included in the "custom operations and equipment rental" category.

**Fuel, lubrication, and electricity** include the dollars spent for all fuels, motor oils, and electricity for irrigation. Electricity for non-irrigation purposes was included in general grove overhead.

**Repairs** include the dollars spent for repairs and parts for motor vehicles, machinery, equipment, irrigation, and frost protection. This would include over-

hauls, tuneups, tubes, tires, and other repairs.

**Hired labor** includes total cash wages and cash bonuses paid to all hired workers (including cash wages paid to family members). Cash wages paid to the operator are excluded. Hired labor also includes any contract labor where workers are paid by a crew leader, contractor, buyer, processor, cooperative, or other person having an oral or written agreement with the operator. Cash expenses for paid labor benefits such as life or health insurance, pension or retirement plans, workmen's compensation, employer's share of Social Security and unemployment taxes are included in the hired labor expense.

**Purchased irrigation water** includes the amount spent for irrigation water and drainage assessments and fees. Also included are pumping and overhead costs for private association water.

**Interest on operating loans** includes both interest and service fees on operating loans.

**Miscellaneous expenses** include accessories for motor vehicles and machinery, office equipment purchases, marketing containers, and transportation of items to market or between farms.

**Interest on real estate debt** includes interest and service fees secured by farm land or buildings and other real estate debt. This includes the operator's dwelling if located on the operation.

**General grove overhead** is a composite of expenses for utilities (nonirrigation electricity, telephone, water, etc.), all noncrop insurance (such as the farm share of motor vehicle liability and blanket insurance policies), registration and license fees for motor vehicles, and general business expenses (such as accounting fees, legal fees, travel, memberships, farm management services, soil testing, magazines, office supplies, coop fees, advertizing). Also included in general grove overhead are purchases of farm supplies, hand tools, and farm and shop power equipment. Finally, farm and land improvements and maintenance (such as fencing, operator's dwelling, hired labor and tenant dwell-

ings, and other farm buildings) are included in general grove overhead.

**Capital replacement** costs were based on FCRS information for the number of vehicles by type (pick-ups, single axle trucks, tandem axle trucks, semi trucks, buses, and vans), the number of tractors by engine size (less than 30 horsepower (hp), 30-39 hp, 40-59 hp, 60-109 hp, 110-169 hp, and 170 and above hp), and other equipment by type used for orange production. For each vehicle and tractor category and equipment type, the operator was asked to report the total percentage of time it was used for citrus production and its average replacement age. Based on this information, annual capital replacement costs were estimated.

Capital replacement costs for wind machines and grove heaters (excluding irrigation systems), were calculated using straight line depreciation (assuming zero salvage value) and the operator's information on the percentage of time used for citrus production and replacement age. Investment costs for installing electric and gasoline-, diesel-, or propane-powered wind machines were obtained from equipment manufacturers and secondary sources.

For irrigation systems, capital replacement costs were calculated for pumps and distribution systems only. Wells were not depreciated. They were valued at drilling cost and included with land value. In many cases, wells transfer with land and would, therefore, enhance land values. Straight line depreciation was assumed using zero salvage value and a 12-year useful life for pumps and a 15-year life for the distribution system. Drilling costs, pump prices, and distribution costs were obtained from dealers and contractors in each State.

**Full economic costs** estimate the full ownership costs associated with a citrus operation, and they indicate the average long-run cost that must be recovered annually from farm revenue to keep land in citrus production and maintain the enterprise's long-term viability. To calculate full economic costs, a return is calculated for operating capital, other nonland capital, unpaid labor, and land. This total is added to variable cash expenses (less interest on operating capi-



tal), general farm overhead, real estate and property taxes, and capital replacement. Any residual cash receipts after subtracting full economic costs is assumed to be a return to management and risk.

A rate of return to land and nonland capital is computed by using a 10-year total return to production assets in the agricultural sector (previous 10 years), minus the value of the operator's labor each year, and divided by the total market value of agricultural production assets. The average market value of non-

land capital (including tractors, vehicles, and equipment), plus the value of land reported by the survey respondents, is multiplied by this 10-year-average return. Earnings from inflation (capital gains or losses from depreciation) are not included in the citrus enterprise budget.

# The California Water Crisis

by  
Doyle C. Johnson<sup>1</sup>

**Abstract:** The California drought, now in its fifth year, is setting new records and causing serious problems for farmers, urban water users, and environmental resources. Water transfers and conservation measures should help to ease the situation for critically short areas as the irrigation season progresses. Water storage in reservoirs is projected to be at the second-lowest level on record by September 1991, which may jeopardize water supplies for 1992. This article reviews the California water situation and outlook for the current crop season with special emphasis on fruits and vegetables.

**Keywords:** Central Valley Project, State Water Project, drought, runoff, acre-foot, water year, water rights, ground water, water transfers, deep wells, irrigation, overdraft.

## California Water Demand Is Growing

The water shortage this year in California will have serious repercussions for agriculture. However, the effects on the fruit, tree nut, and vegetable sector are not expected to make a significant difference in produce availability and consumer prices. This year the demand for water has been accentuated by the extended drought, now in its fifth consecutive season. While the State's population grew by 7.5 million people during the last decade, there was little new construction of reservoirs and water conveyance systems. Water needs for businesses, industry, and other sectors have also grown dramatically.

Irrigated agriculture is about 500,000 acres higher than it was 20 years ago, but the number of irrigated acres has fluctuated widely during the 1980's. Today irrigated farmland is estimated at about 9.2 million acres, including irrigated pastures and counting each crop on cropland that produces more than one crop in the same season. The highest acreage irrigated was 9.7 million acres in 1981, according to the California Department of Water Resources. Most of the increase in irrigated farmland during the last 20 years is additional fruit and vegetable acreage which now comprises 43 percent of the irrigated cropland. The increase in fruit and vegetable acres has been partially

offset by a decrease in other irrigated crops as a result of Federal programs removing acreage from production.

## Water Is the Lifeblood of California Agriculture

Agriculture in California depends heavily upon irrigation water, especially from May through October, when the majority of crop production occurs and precipitation is normally little or non-existent. Most crops grown in California are irrigated. Much of the irrigation water is delivered by a network of aqueducts and canals. The water originates as rainfall and snowpack runoff in the mountains. It is stored in the State's various reservoirs and later released into irrigation canals on the basis of demand. In a normal year, about 60 percent of the State's irrigation water originates from surface water storage reservoirs; the other 40 percent is provided by deep wells that pump ground water. Last year, when surface supplies from State and Federal water sources were cut in half, wells provided an estimated 60 percent of the State's irrigation water.

## The Nation Depends Heavily on California Agriculture

California is the nation's largest producer of agricultural commodities, accounting for about \$17 billion in crop and livestock cash receipts (about 11 percent of the U.S. total). California produces about 250 commercial agricultural commodities. For 58 of these, the "Golden Bear State" is the Nation's leading producer. The State accounts

for half of the total U.S. output of fruits, about one-third of vegetable and melon production, and most of the supply of tree nuts. Fruit and tree nuts are grown on about 2.2 million irrigated acres and vegetables and melons are planted on about 1.0 million irrigated acres. In addition, California grows a total of 249 greenhouse and nursery crops—close to 22 percent of the Nation's production—on approximately 75,000 irrigated acres.

## Driest 5-Year Period on Record

Water years 1987-91 (October 1986-September 1991) will most likely be the driest continuous 5-year period on record to date. The longest, driest, consecutive period on record was the 7 years between 1928 and 1934. The driest 5-year period, currently on record, also occurred during the 1928 to 1934 period. The 1991 water year is being compared to 1977, due to similar reservoir water storage and rainfall levels. However, the 1977 drought was not preceded by 4 consecutive years of abnormally low precipitation.

For example, California's average annual runoff of 71 million acre-feet (m.a.f.)<sup>2</sup> ranges from an all-time annual low of just 15 m.a.f. in water year 1977 to an all-time annual high of 135 m.a.f. in water year 1983. Runoff for water

<sup>1</sup> Agricultural Economist, Economic Research Service, U.S. Department of Agriculture.

<sup>2</sup> An acre-foot of water is equivalent to the amount needed to cover an acre to the depth of one foot or about 326,000 gallons.



year 1991 is expected to total at least 20-22 m.a.f. based on early March conditions, according to the State Hydrologist. Approximately 75 percent of this volume is destined for agriculture.

Precipitation statewide from October 1, 1990, to March 9, 1991, has been about 45-50 percent of normal. About 20 to 25 percent of the total accumulated rainfall occurred from February 27, 1991 to March 9, 1991. Runoff since October 1, 1990, has also been well below normal. Annual precipitation in the State averages 23 inches, ranging from almost nothing in the desert areas to over 100 inches in the mountainous areas of the north coast. Rainfall in late February and early March this year brought some temporary relief to the State. However, much of this moisture has been readily absorbed by the dry soil and there has been only limited runoff. Even if normal rains are received during March and April, the last 2 months of the "rainy" season, this will only help to ease the drought situation.

Water levels in reservoirs that supply the important Central Valley Project (CVP) totaled only 1.3 m.a.f. on September 30, 1977, the end of the busy irrigation season. By September 30, 1991, the Bureau of Reclamation (U.S. Department of Interior) projects that the total CVP reservoir storage level could be drawn down to 1.6 m.a.f. of water (figure B-1). The desired carryover on September 30 for the CVP is 8 m.a.f. The projected drawdown on the CVP in water year 1991 could jeopardize the 1992 irrigation season, unless higher-than-normal rainfall and snowpack runoff are received yet this year and during the winter-spring months of 1991-92.

### ***The Drought Is Affecting All State Resources and Users***

The persistent dry conditions aggravated the December 1990 freeze damage to citrus groves, vegetables, ornamentals, and other crops. When trees and other plants lack sufficient soil moisture they are more vulnerable to a freeze. Damage may have been less if adequate irrigation water had been available to mitigate the effects of the cold weather. The drought has also severely affected California's livestock operations by reducing the amount of range feed. Less irrigation water will

also result in lower supplies of feed grains and hay. In addition to farmers, there are serious economic impacts stemming from the drought for urban users, energy resources, fish, wildlife, and recreation.

Although California fruit and vegetable production is not expected to drop significantly, some individual growers will suffer losses and economic hardships due to the lack of irrigation supplies. Municipal and industrial (M&I) users will also feel the pinch of short water supplies. Municipalities are offering to purchase water from farmers who are willing to relinquish a share of their water supply.

### ***Surface Water Supplies Supplement Ground Water Supplies***

There are 155 major reservoirs with a gross storage capacity of 37.7 m.a.f., excluding interstate and Colorado River System reservoirs. Thirty-three reservoirs are Federal projects, 11 are State projects, and 3 are joint Federal-State projects. The remaining 108 reservoirs are controlled by local water operators including municipalities, power companies, and irrigation districts. These local surface water projects (as distinguished from State or Federal projects) provide about one-third of California's water needs in normal years. Local water agencies have the normal capability to provide 10 m.a.f. of surface water each year to agricultural and urban users.<sup>3</sup>

California's ground water resources are much larger than its surface water reservoirs. There are nearly 400 ground water basins that store about 850 m.a.f. of water. Much of this water is not available for use, is of poor quality, or cannot be pumped economically because of depth or other reasons. On the average, 16.6 m.a.f. of ground water is pumped yearly, meeting about 40 percent of California's applied water requirements for municipal, industrial, and agricultural uses. Ground water

pumping exceeds recharge by an average of 2.0 m.a.f. a year -- a deficit condition referred to as "overdraft".<sup>3</sup> In drought conditions, overdraft increases dramatically.

### ***Water Availability Varies by Region***

Where growers get their water and the supply available to them this year varies widely by region. Some rely on State and/or Federal supplied irrigation districts and others on privately supplied irrigation districts or farm-owned wells. Many have more than one source of water. Growers in the Central Coastal area depend almost entirely upon wells. Southern California desert areas such as the Imperial Valley, the Coachella Valley, and the Blythe district near Yuma, Arizona, depend mostly upon the Colorado River System (CRS) which has ample water available.

Additional water allocations may be made to Los Angeles Basin users from the Colorado River to substitute for this year's water shortfall. Typically, California imports about 4.8-5.0 m.a.f. of water for all uses from the Colorado River. The State is entitled to 4.4 m.a.f. but has been allowed to draw additional quantities because Arizona has not been drawing its full entitlement. Water imported by California from the Colorado River is used entirely within Southern California and is not conveyed to the Central Valley. There is neither the legal nor physical infrastructure in place to transfer water from the Colorado River System to the Central Valley.

The federally operated Central Valley Project (CVP), in a normal year, delivers enough water for about one-third of the State's irrigated farmland. CVP water for agriculture is delivered to users in the Central Valley which contains 78 percent of the irrigated acres in the State. The Central Valley extends about 450 miles from Redding in the north to Bakersfield in the south -- it is about 100-miles wide at its widest point. The Sacramento Valley, the portion of the Central Valley north of Sacramento to Redding, is the major source of water for the CVP. Water from rivers and reservoirs in the San Joaquin Basin also supply the CVP. The San Joaquin and Tulare Lake basins comprise the southern portions of the Central Valley.

<sup>3</sup> Source: "California Water: Looking to the Future," Bulletin No. 160-87, November 1987, and Statistical Appendix, January 1988, California Department of Water Resources.



Farms in the southern areas of the Central Valley depend heavily upon water that originates in the Sacramento Valley. Throughout the Central Valley, the CVP in a normal year will deliver about 7.1 m.a.f. of water, with about 87 percent going to agriculture and the remainder going to urban areas.

### **No Water Available From State Projects**

On February 4, 1991, the California Department of Water Resources (CDWR) announced it would halt all water deliveries to agriculture during the remainder of water year 1991.<sup>4</sup> The cutback amounts to about 1.2 m.a.f. of agricultural water. In a normal year, the State Water Project (SWP) delivers about 3.5 m.a.f. of water—1.2 to agriculture and 2.3 to M&I users. Crops generally require 1 to 4 acre-feet of water, with most requiring 2 to 3 acre-feet during the entire season. Virtually all State water deliveries for agriculture are used in the southern half of the Central Valley, primarily Kern County and a portion of Tulare County.

State project water generally originates from storage in the Sacramento Valley's Oroville Reservoir on the Feather River. This water is later released into the Sacramento River system, and then is pumped to the San Luis Reservoir (located in the northern part of the San Joaquin Valley). Later, the water is released into the California Aqueduct which leads to the southern Central Valley and Southern California urban areas. The Oroville reservoir is a State project while the San Luis Reservoir is a joint State-Federal project.

### **Deepest Cuts Ever This Year in Federal Water Deliveries**

The Bureau of Reclamation stated February 14, 1991, in its initial delivery plans for water year 1991 that it will cut water allotments to agriculture by half, or 3.5 m.a.f. There have been no changes in the Federal allotments as a result of the late February and early March rains. The desired water delivery level by the Federal projects is 8.0-8.5 m.a.f. of water. Of the 3.5 m.a.f. of water expected to be delivered by the

Table B-1--Federal water: Capacity, storage levels on March 13, 1991, and forecasts for Water Year 1991

Reservoir	Storage capacity	Storage on March 13, 1991	Maximum storage for 1991	Minimum storage for 1991
--Acre-feet--				
Clair Engel	2,448,000	1,004,200	1,179,000	594,000
Whiskeytown	241,100	199,000	210,000	90,000
Shasta	4,552,000	1,763,500	1,795,000	592,000
Folsom	1,010,000	291,200	333,000	117,000
New Melones	2,420,000	392,400	392,400	71,000
San Luis 1/	971,000	737,200	737,200	78,000

1/ Federal share only.

Source: U.S. Department of Interior, Bureau of Reclamation.

CVP, an estimated 2.2 m.a.f. will be delivered to holders of prior water rights and the remainder of 1.3 m.a.f. to agricultural and M&I users under contract. Urban water users will receive 25-100 percent of normal supplies, depending upon their contracts. This initial Federal water allotment is based on a forecast runoff of 5.9 m.a.f. to the Sacramento River Basin in water year 1991.

Most agricultural water service contractors buying water from the CVP will receive only 25 percent of their normal delivery. Last year, because of the drought, the Bureau of Reclamation cut deliveries to these water service contractors by 50 percent. In 1991, prior water-rights holders on the Sacramento River, as well as San Joaquin River exchange contractors, will receive 75 percent of their normal supplies. Prior water-rights holders, including irrigation districts and individuals, hold riparian and senior appropriative water rights that were established before construction of the reservoirs and the establishment of the CVP.

On a reservoir-by-reservoir basis, the seriousness of the water shortage becomes very evident. Table B-1 shows the storage capacity, the current (March 13, 1991) projected maximum, and the projected minimum reservoir levels for major CVP reservoirs in water year 1991.

### **State and County Plans To Cope With the Drought**

The Governor of California has established a State Water Bank as a part of his emergency water plan to purchase water—mostly from the Sacramento Valley and San Joaquin Delta water suppliers willing to sell—and reallocate it to users with a severe need. This year, much of the water delivered by the CVP is destined for agriculture in the Sacramento Valley. A major crop use is rice, but the water is also used for irrigating orchards and vegetables. The State Water Bank bid price is \$125 per acre-foot. Water placed in the "Bank" will be allocated to urban and environmental uses as well as agricultural "hardship" cases -- those producers who cannot obtain water from either CVP or State sources or their local irrigation districts, and do not have wells to rely on. Growers of perennial crops are especially likely to be identified as hardship cases. The Governor stated that some water purchased by the State Water Bank could be held over for next year. The Governor also called for all municipalities statewide to have drought-strategy plans to reduce their water usage by as much as 50 percent.

There may be as much as 100,000 acres of perennial cropland in the Tulare Lake Basin and areas of the San Joaquin Basin that currently do not have a water source. However, the Kern County Water Agency hopes to have a sufficient number of wells drilled by April to supply its customers with enough irrigation water to keep the trees and vines alive.

<sup>4</sup> Water year 1991 began October 1, 1990, and ends September 30, 1991.

Typically, tree and vine crops require 4 acre-feet of water per acre to produce a normal yield. If subjected to a 50-percent reduction in their water requirements, trees or vines will generally be sustained, but they will not produce a marketable crop.

In Solano County in the Sacramento Valley, municipal users have offered agricultural users \$170 per acre-foot to purchase water. The County has limited the acreage of crops that can be removed from crop production to 5,000 acres county-wide.

In Monterey County, where the Salinas Valley is a major vegetable producing area, an emergency conservation plan calls for a 20-percent cutback in growers' water use. Agriculture, which depends upon aquifers underlying the valley floor for its water supply, pumps 85 percent of the total water used in the county. Still, the drought, combined with continued pumping of ground water, has lowered the water table and raised pumping costs. The ground water is dependent upon rainfall for moisture replenishment. Growers have

had to deepen their wells to maintain an adequate flow.

### Ground Water Quality Declines With Quantity

Reduced aquifer volumes contain higher concentrations of minerals and dissolved salts (such as sodium and boron). In addition, lower pH levels (more acidity) reduce the yield, size, and quality of fruits and vegetables. In some areas, growers are diluting well water with aqueduct water (from surface sources) to make it usable for crop production.

Costs for pumping well water in the San Joaquin Valley generally average \$65 per acre-foot for wells using electric pumps and \$55 for wells using diesel power. In recent years the wholesale price of Federal aqueduct water from the CVP has averaged about \$26 per acre-foot, but the retail price (cost to the grower) may be nearly double the wholesale price. In addition to the extra cost required to pump ground water versus aqueduct water, growers must invest a substantial amount for well drilling and pumps.

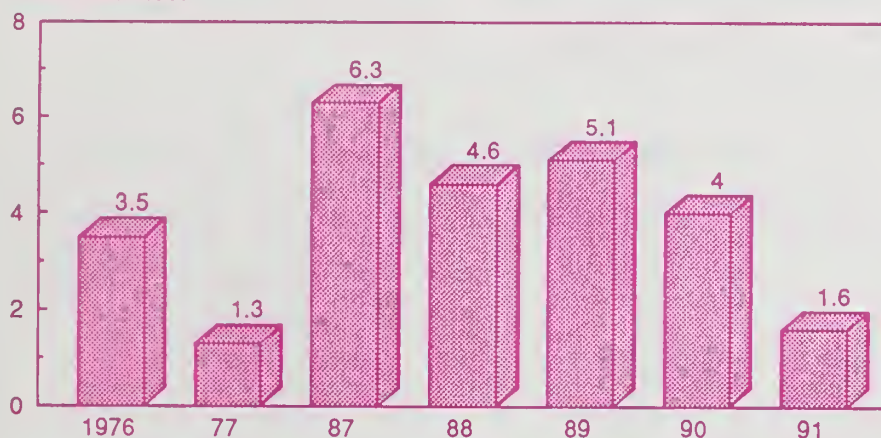
### Less Water Will Lower Farm Revenues

The California Farm Bureau (CFB) estimates that as a result of the drought,

Figure B-1

### Central Valley Project: Reservoir Storage on September 30 1/

Million acre-feet



1/ Desired level is 8.0 million acre-feet on September 30. Excludes Millerton.

Table B-2--Kern County: Crop values, acres, and water use, 1989

Crop	County	Water	Acres	Total	Value	Share
	value	per			per	of Calif.
	\$1,000	acre	--Acre-feet--	water	acre	production
					Dollars	Percent
Potatoes	80,057	1.97	22,034	43,407	3,633	48
Watermelons	8,480	1/ 1.60	3,230	5,168	2,625	37
Garlic	14,326	2/ 3.54	3,051	10,801	4,696	17
Onions, dry	28,761	2/ 3.54	9,760	34,550	2,947	27
Tomatoes, proc.	6,773	2.46	3,000	7,380	2,258	2
Cotton	230,195	2.86	270,945	774,903	850	23
Alfalfa	77,910	4.12	93,542	385,393	833	10
Sugarbeets	20,485	3.44	19,040	65,498	1,076	9
Grapes,						
raisin	117,545	2.45	27,042	66,253	4,347	9
table	116,506	2.45	20,358	49,877	5,723	29
wine	44,290	2.45	28,905	70,817	1,532	11
Almonds	138,600	3.19	71,905	229,377	1,928	24
Pistachios	21,648	2.40	15,751	37,802	1,374	42

1/ Based on aggregate of all melons, squash, and cucumbers.

2/ Garlic and onions aggregated in computing acre-feet.

Sources: Kern County Agricultural Commissioner and University of California Extension Service reported data.



500,000 to 1 million acres of cropland will be removed from production statewide in 1991. Much of this will be cotton and rice acreage. The drought will have a negative impact on yields and quality of irrigated crops. There will be considerable reallocation of available irrigation supplies by growers, water transfers within irrigation districts, and transfers between regions. If the drought can be said to have any benefit, it would be as an incentive to use more efficient irrigation practices and to improve planning for future droughts.

### ***Crop Returns Will Alter Irrigation Use***

Where crop production plans can be altered, an important decisionmaking factor for farmers will be the dollar value (gross return) per acre. In Kern County, 1989 data collected by the County Agricultural Commissioner illustrates the wide disparity among crops (table B-2). Table grapes topped the list with a gross value of over \$5,700 per acre. Other fruits, tree nuts, and vegetables ranged from \$1,400 per acre for pistachios to \$4,700 per acre for garlic. On the bottom of the list at \$800 to \$1,100 per acre were field crops—sugar beets, cotton, and alfalfa. Water is lim-

ited and more costly this year, so its use and the resulting return is of increasing concern to California growers.

In conclusion, the drought is not expected to make a significant difference in availability or consumer prices of fruits and vegetables because many growers will shift their water supplies to higher value crops. Also areas not affected by the drought will increase production. However, in areas severely affected by the drought, such as Kern County, growers will need to make difficult economic decisions regarding which crops to produce based on cropping flexibility, contracts or other commitments, and available water.



The line graph illustrates the projected growth of the elderly population in the United States. The x-axis represents years from 1980 to 2020 in 5-year increments. The y-axis represents the number of people in millions, ranging from 20 to 40. The line starts at approximately 22 million in 1980, rises to 24 million by 1985, dips to 22 million in 1990, and then shows a consistent upward trend, reaching approximately 40 million by 2020.

Year	Number of People (millions)
1980	22
1985	24
1990	22
1995	26
2000	28
2005	26
2010	30
2015	34
2020	40

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